

# *The* **Iron Age**

A CHILTON

PUBLICATION

NATIONAL METALWORKING WEEKLY

CONTENTS PAGE 2

July 9, 1953  
UNIV. OF MICHIGAN

JUL 9 1953

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## **NORMA-HOFFMANN**

### **Roller Bearings**

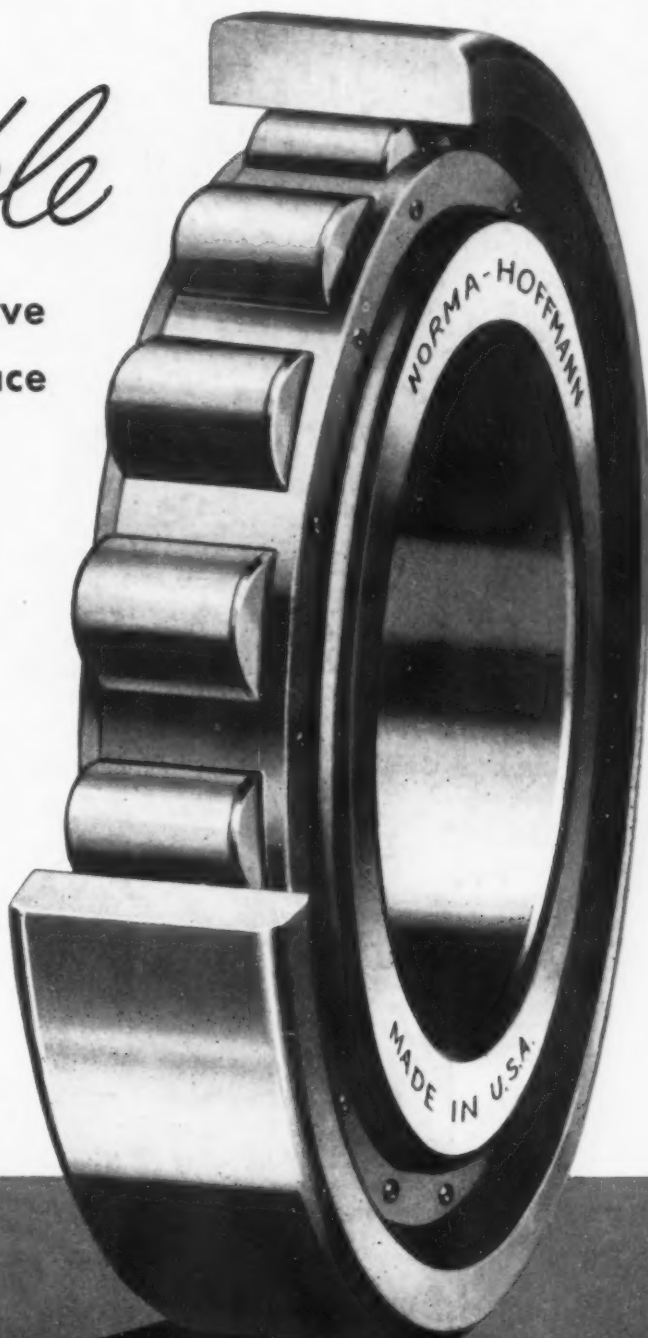
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## Are You Using Special Alloy Steels for Standard Alloy Jobs?

An estimated 95 of every 100 civilian and military jobs that require alloy steel can be handled effectively with AISI standard alloy grades. Generally speaking, the exceptions that call for special alloy grades are those jobs involving resistance to heat, corrosion, or low-temperature impact.

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At Bethlehem we manufacture special-analysis alloy steels as well as the entire range of AISI standard alloy grades and standard carbon steels. We are obviously in a position to make unbiased recommendations. Our metallurgists are experienced in solving problems that pertain to all types of steel. Call on us for advice at any time.

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# BETHLEHEM *ALLOY* STEELS



July 9, 1953

# The Iron Age

Vol. 172, No. 2, July 9, 1953

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# DIGEST of

## NEWS DEVELOPMENTS

### ELECTROLYTIC TITANIUM METHOD LEAVES LAB—P. 73

New process for direct electrolytic reduction of titanium dioxide moves into pilot plant stage. Expect initial pilot operations in October. Claim indicated price of less than \$1.50 per lb based on 50-ton-a-day commercial plant. Have four firm offers to license process if pilot plant proves successful.

### AIR FREIGHT PAYS FOR MACHINERY BUILDERS—P. 74

Machinery is flying high these days—it has now become the top revenue cargo item for airlines flying to the West. Last year it represented \$870,000 for United Airlines into San Francisco alone. And equipment manufacturers find that it pays off. GM has a flying conveyor between Detroit and Boston.

### GUARD SYSTEM VITAL TO PLANT PROTECTION—P. 78

An adequate plant protection system is a major factor in properly protecting industrial property. Security requirements have mushroomed since start of World War II. But proper system handles many types of problem. Independent system on contract basis can save management many headaches on plant protection.

### MILITARY FUNDS CUT BUT SPENDING HOLDS—P. 83

First step in forcing economy on the military services was taken last week when the House Appropriations Committee reported out the defense appropriations bill after trimming more than \$7 billion from the Truman budget. But carryover funds will swell spending to previous levels. List funds for major items.

### HUMPHREY SYMPATHETIC ON DEPRECIATION—P. 93

Treasury Secretary George M. Humphrey is listening sympathetically to industry proposals that depreciation time be cut from the unrealistic 20 years to 10. Budget deficits may work as a dampener to quick action. Inducement is the chance of getting a larger tax revenue later after suffering an initial tax loss.

### SEEK MORE APPLICATIONS FOR COLD-FORMING—P. 99

Industry is hunting for ways to substitute cold-forming for other production methods. GE recently found way to use it to thread jet turbine shafts. If problems can be solved, cold-forming could bring major advances in jet engine development. Uncertainty about world conditions is slowing machine tool orders.

THE IRON AGE

# the Week in Metalworking

## ENGINEERING & PRODUCTION

### GAS NITRIDED 4140 STEEL HAS TOUGH CASE—P. 129

Precision machine parts made from 4140 steel have been successfully gas nitrided. That means lower costs for parts where aluminum-bearing steels are either too brittle or too costly. Part shape is less critical. Nitrided 4140 has a tough case which is nongalling and highly wear resistant.

### COLLOIDAL GRAPHITE PROTECTS BEARINGS—P. 135

Under severe service conditions, lubricants require additives to maintain film strength. One of the best is colloidal graphite. The lubricating film can withstand temperatures up to 600°C in a normal oxidizing atmosphere. It can be used with a dry solid lubricant, and in water, oil or alcohol.

### FAILURES CUT IN HIGH TEMPERATURE ALLOYS—P. 137

Metals used at high temperatures increase failure problems. Although materials become weaker, high temperature applications demand better performance. A key to the solution of these problems is to recognize the nature of the failures. Metals differ widely but the failures are similar.

### WHAT DO YOU KNOW ABOUT LABOR UNIONS?—P. 141

Some little known facts—and some popular misconceptions—about employee opinions are disclosed in a recent survey by Group Attitudes Corp. Nearly 2000 hourly workers in 15 cities in eight eastern and midwestern states were interviewed. About 90 pct belong to unions—AFL, CIO and UMW affiliates.

### HOW TO MAKE SURE YOUR SLINGS ARE SAFE—P. 144

Tested and proven rated capacities and design factors cover all types of slings to insure their safe use. If properly applied, these data assure safety at minimum expense of time and equipment. Typical problems are solved to familiarize operators on how to quickly apply these data.

### NEXT WEEK—LIFT TRUCKS RAISE LEVEL OF STYLING

Stability, maneuverability and safety have been built into a new streamlined fork truck. All parts were engineered into an attractive rugged truck made with a minimum of tool and die costs. Based on simple triangular shape, the truck seems to hug the ground. Operators take pride in its appearance.

## MARKETS & PRICES

### AGRICULTURAL EQUIPMENT SALES IMPROVE—P. 71

Farm equipment sales in second quarter have refuted pessimistic predictions based on poor performance in first period. Most producers have liquidated losses incurred in the Jan.-Mar. period, and the overall sales outlook for 1953 is good. The market is reverting to seasonal patterns, but sales will be close to '52.

### ABRASIVE MAKERS UNWORRIED OVER SALES DIP—P. 72

Abrasives producers aren't getting very upset over a predicted decline in sales of 12-15 pct in the second half. First half sales have been running at 1952's peaks, and a seasonal sales dip is customary. Sales to foundries are staying sluggish, but overall abrasives look good for some time to come.

### PRESTRESSED CONCRETE BEAM FIELD SPROUTS—P. 77

A comparative newcomer to the U. S. the prestressed concrete beam for building is coming of age—fast. IRON AGE was told volume of prestressed building is increasing 200 pct per year. Railroads are testing prestressed beams. Favorable results could open a new market. Prestressed, poststressed advantages.

### FIRST CORVETTE COMES OFF LINE ON TIME—P. 88

Chevrolet met its June production goal for its new Corvette plastics sportster. Output for the balance of '53 is scheduled at 50 per month, with 1000 monthly planned in '54. Plastics is expected to have much value in design, but more study is needed. Rigidity, finishing costs are still problems.

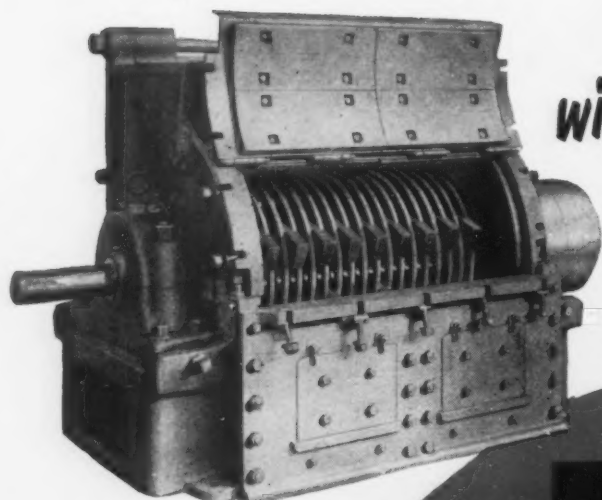
### STEEL'S FOURTH QUARTER BOOKS FILLING—P. 153

Steel producers who opened fourth quarter order books report they are filling up at a highly satisfactory rate. It seems inevitable there will be carryovers entering the fourth quarter. This should quell any fears the steel market will deteriorate—but there's no denying supply-demand move closer.

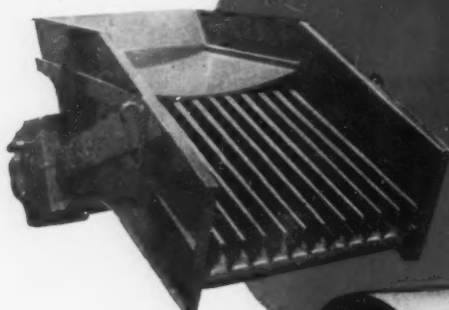
### ALUMINUM WAGE PARLEYS MOVE SLOWLY—P. 156

Wage talks between Aluminum Co. of America and the United Steelworkers thus far have been brief and of an exploratory nature. Neither side is letting any information leak. USW's bargaining position in aluminum is stronger than it was in steel. Aim is to get aluminum wages on par with steel.



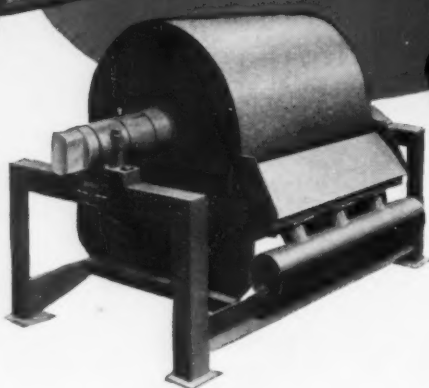


**CRUSHERS**—The Jeffrey Type B Swing Hammer Crusher for severe duty. Being used successfully on limestone, shale, slate, clay, chalk, marl, gypsum, phosphate rock and asbestos rock. Shown is a 36" x 24" unit.



### VIBRATING FEEDERS

The Grizzly Feeder shown provides both a feed and non-clogging grizzly in a single unit—is extremely flexible—handles large tonnages. Also Pan Feeders.



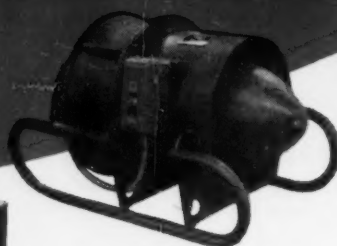
### MAGNETIC SEPARATORS

Type CO Magnetic Separator shown is designed for recovery of magnetic medium in a standard Heavy Media plant. Separators are of the drum type, have the advantages of extreme simplicity—high capacity—minimum supervision. Bulletin No. 846.

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## Editorial

*The Iron Age*

FOUNDED 1855

## Junior Executive Week

THE word has been out for some time that we are short of executives. Major speeches at association meetings highlight this point. Recent studies also show a high turnover in top positions. The problem gets worse.

Newspapers bear out this executive shortage. Ads appear every week calling for men with high grade experience. Some company officials claim their firms haven't enough material to fill top vacancies. Others reach over into other companies and pick up their man or men.

While this top level worrying, planning and hiring goes on, lower executive levels in the company seethe at times with resentment and frustration. Most of this feeling is probably unwarranted. But it is there and it has a negative effect—at a time when the accent should be on the positive.

As long as men work and some are promoted we will have a certain amount of "industrial disappointment." That is life. But under today's conditions, with its demands on top management, misunderstandings can get out of hand.

What can be done about some junior executives who believe they have arrived, who feel they should have "the job"? If they get blunt treatment they rebel inwardly—or outwardly. Even if they are patiently told they don't have the specific talent or experience for the job many are likely to pay no heed to such advice.

Despite this, maybe management is missing some good bets in its own companies. Choosing top people is not an exact science by any means. Personal traits, likes and dislikes have a habit of fouling up objective thinking.

There are men at the helm today who never would be there had they not been picked by a person who had a humane sixth sense. But they were picked and they did make the grade. Trial and error and time are often not given the credit they deserve.

Why not select possible key executives and let them actually run the show? The boss can be available for emergencies of the dire type. Let these candidates make the decisions, take the guff, try out prize ideas and get the feel of "no return."

After the training some may show hidden ability and talents. Others will be glad to go back on their own jobs—with an end to griping. Junior executive week (or month) could pay human dividends.

*Tom Campbell*

Editor

July 9, 1953



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# Dear Editor:

Letters from readers

## Steel Prices

Dear Sir:

I have read with interest your press release of Wednesday, June 24, on the subject of the recent steel price increases, in which you state that "the nation's steel bill" will be increased by more than \$800 million a year, based on the current rate of production, because steel prices have been raised an average of about \$9.30 a ton.

Your figure of \$9.30 a ton was apparently based on a calculation of the "Iron Age Finished Steel Composite Base Price," this weighted price index being based on "the prices of ten of the most common steel products accounting for the major portion of finished steel shipments."

While it would be in order to question the validity of a price index which omits some important items (as, for example, tin plate, which is a product of major importance to the steel industry and the price of which was not recently increased), I would like to comment on two other matters bearing on your release.

First, the true significance of increasing "the nation's steel bill by more than \$800 million a year" cannot be appraised unless the increase is considered in relation to the nation's total bill for all products. The value of the total national product in 1953 is estimated at \$361 billion. Therefore, even if the figure of \$800 million a year were correct, it would mean an increase in the dollar value of the nation's national product of only two-tenths of one percent. However, there are some offsetting factors which will act to reduce the nation's total steel bill, as, for example, the elimination of costly conversion steel, the substitution of cheaper domestic products for foreign steel, the availability of steel at the times and in the exact sizes needed which will eliminate costly fabrication, and the ability to obtain mill shipments and thus reduce the use of warehouse stocks. All of these have come about as the result of the expenditure by the steel industry of billions of dollars since the end of the war for expansion of production and for improvements in costs and qualities.

But more important is the question of whether the industry actually needs these price increases. I believe I am correct in stating that you yourself have on several occasions indicated that the price of steel is below "parity" with respect to other basic industrial products. The low price of

steel is directly reflected in the earnings position of the major companies in the steel industry. It is a notorious and very regrettable fact that the investment standing of the major steel companies has been very poor in recent years—so poor, in fact, that the stock market investor has valued steel producing capacity at only a small fraction of the cost of replacing it.

For example, current quotations on the stock of the eight largest steel producers with 77 pct of the country's ingot capacity indicate a market value of \$29.09 per annual ingot ton of capacity, including all raw materials etc. It is conservatively estimated that the cost of replacing the steel making and finishing plant alone would be not less than \$300 per ingot ton of capacity!

It is of interest to note that while the total market value of the fixed assets and raw materials reserves of these eight steel companies, as of June 25, 1953, was \$2,632,000,000, these companies have actually spent for plant rehabilitation and expansion \$4,167,000,000 during the seven years 1946-1952, inclusive.

The reason for the low values placed on steel stocks by investors is simply that those stocks have a poor earning position relative to other industries.

It is quite obvious that an industry which has such poor earning ability cannot continue to attract investment capital in competition with other industries which show a far better return . . . The steel industry cannot continue to function and be healthy under such conditions. This country cannot get along without steel production. It must have steel. Based on the experience of the past twenty years, it is quite obvious that unless private industry can produce steel to meet the nation's needs, the government will step in and produce it. This would mean inefficiency, higher costs, and greater burdens on the taxpayers. That has been our experience with all government industrial operations.

The investment status of the steel industry must be improved . . . Therefore, while continuing efforts have been and will be made to reduce production costs, the industry must be paid a higher price for its services to the American people if we are to maintain this basic industry as a pillar of our free enterprise system. This inevitably means higher steel prices.

BEN MORELL  
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- ☐ Phillips Recessed Head Screws
- ☐ Machine Bolts
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- ☐ Knurled Nuts

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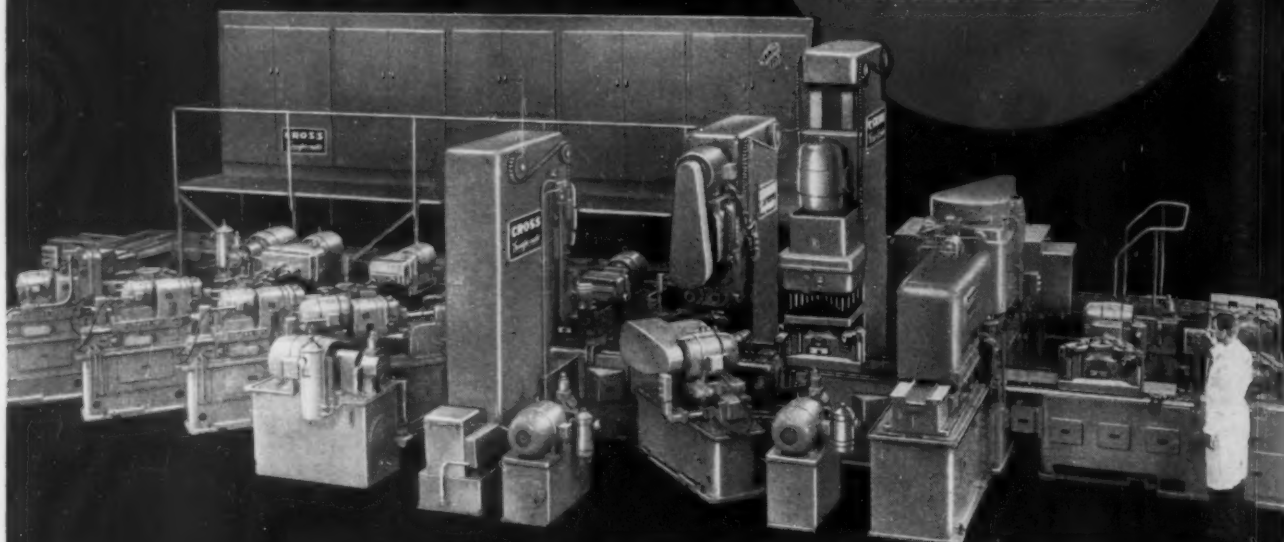
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BOLTS**

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DETROIT 7, MICHIGAN  
*Special* MACHINE TOOLS

# Fatigue Cracks

by William M. Coffey

## Only One Number One (Cont.)

At the risk of having you turn the page too quickly by harping on our favorite subject, the unsurpassed leadership of THE IRON AGE, here's a picture of Editor Tom Campbell (on the right) as he receives, on behalf of your fjj, first prize from Industrial Marketing's Editor, S. R. Bernstein, in the Fifteenth Annual Business Paper Editorial Competition in which 515 magazines were represented.



Tom even looks like "The Happy Gambler," nescafe pas? Please renew your subscription.

## Exercisers Anonymous (Cont.)

This splendid movement is really moving. You'll remember from last week that it is designed to rescue lost exercise souls—not just party exercisers who occasionally swing a croquet mallet, but those who have become chronically dependent on exercise to the detriment of their family relationships and their work.

Now Mr. John Blank of a far western state writes us that several chapters have been established there and a new treatment has been developed. We know that some exercise addicts cannot stop immediately. They must taper off. For this type, a new lawn mower has been applied with great success—recognized therapeutic treatment.

For the patient, who at first labors under the misapprehension that grass needs cutting, we recommend this new type lawn mower that operates unattended, permitting the patient to lie quietly in his hammock, which, of course, is where he belongs.

This lawn mower is called the "Grass Finder" and is manufactured by Fairbanks, Morse & Co. A remarkable piece of equipment, it has mechanical "feelers" that pilot it along the edge of a swath that has been cut. The operator has only to mow a strip around the outside of the plot of grass (part of the tapering off process), then put the machine on its own.

The mower will find its way unerringly around the curves and corners, working towards the center of the progressively diminishing unshorn area. After finishing the job, it will continue to move in a small circle.

## In Re Metallurgia

If you know a metallurgist who does a nice job on report writing, feels he'd like to write more, travel a bit, meet interesting people—you can do him a big favor. Tell him THE IRON AGE is looking for a good metallurgist for its editorial staff. He'll locate in New York, call on top men for the latest in the field, edit the manuscripts of top men.

It's only once in a long while an editorial position is open on our staff and, needless to say, there's no better spot for a man interested in engineering journalism. It's a fine opportunity for a really rewarding job. Hard work but, take it from us, on THE IRON AGE it's fun. Drop a line to Managing Editor George Sullivan for the full treatment. Address: THE IRON AGE, 100 East 42nd St., New York 17, N. Y.

## Puzzlers

\$2.57 and \$3.43 is the way you divide \$6 between two boys so that one may have one-third more than the other. Winners: Miss Penny Post, Mrs. E. A. Simons, H. R. Boyer, Paul A. Tackett, John T. Morris, Isadore J. Bey, Kenneth Roth, Albert Alles, Wilbur E. Wright, Barbara Runkle, E. A. Chimner, George Hines, Henry Kent, Allen Hermes, Alfred Grunwald, Bob Miller, G. A. Pfeiffer, William Rivington, Anne Middlebrooks, Walter Merz, Willis Morton, Harry Odzer, John O'Donnell and Mr. Rice.

## New Puzzle

One car travels at the rate of 60 miles per hour and another at 48 miles per hour. How much of a head start must the slower one have to arrive with the other at the end of a 720 mile journey?



## Extruded or Roll Formed?

WERNER CAN PRODUCE IT  
and Heat Treat—too  
in T4-T6 Temps

IN	VOLUME
TO	PRECISION
WITH	SERVICE

Here's one source for your extruded or roll formed requirements that will back you up with all the service you need. Over 100,000 feet of floor area . . . 30 years of experience and millions of feet of custom extruded and roll formed sections make Werner a reliable, resourceful and skilled supplier.

Secondary operations also available . . . Anodizing, Cutting, Punching, Bending, Welding, Polishing, Assembly.

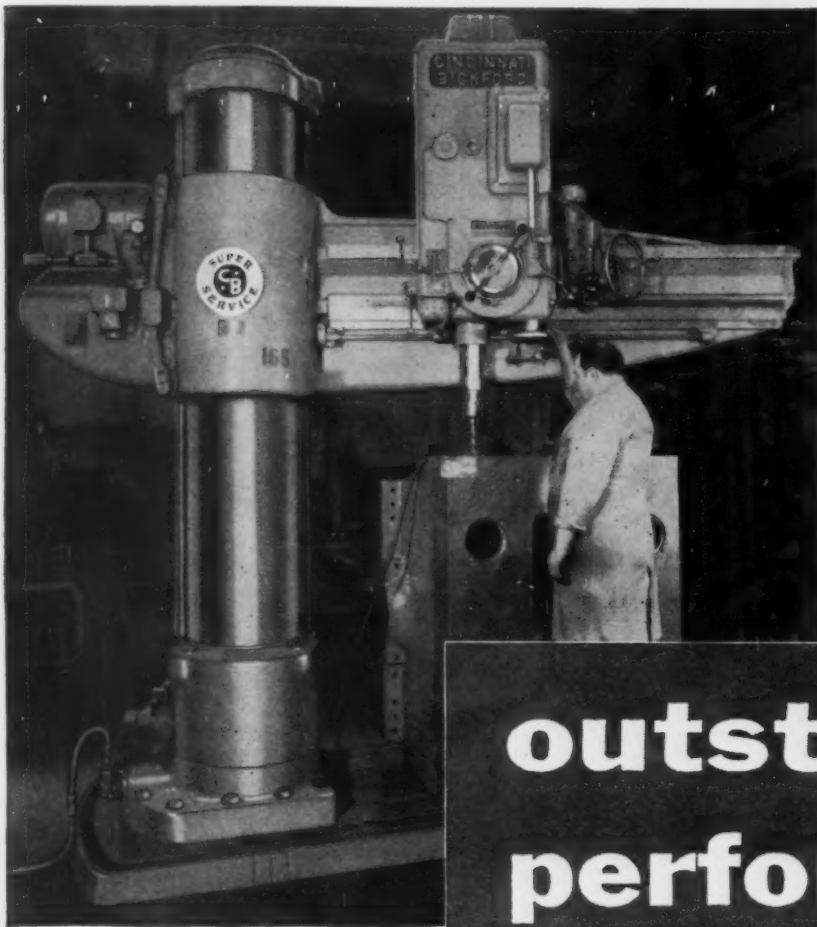
Here are a few of the many products on which Werner shapes are used . . .

ELECTRICAL FIXTURES	TRAILERS, TRUCKS AND BUSES	TV ANTENNA TUBING & MASTS
STORM DOORS AND WINDOWS	RAILWAY COACHES	FURNITURE
SLIDING DOOR HARDWARE	AIRCRAFT	APPLIANCES

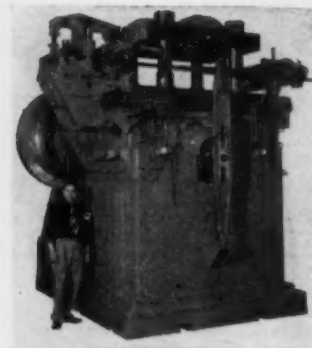
Whatever your product or your problem, call Werner—sales representatives are located in all principal cities—or WRITE for facilities folder today. R. D. Werner Company, Inc., Dept. I-2, 295 Fifth Avenue, New York 16, New York. Factories: Greenville, Pa.; Oshawa, Ontario, Can.

**Werner** ALUMINUM  
Custom Extrusion and Roll Forming  
Aluminum or Stainless Steel





Photos courtesy Henry & Wright Mfg. Co., Hartford, Conn.



This 350 ton Dieing Machine is produced at the Henry & Wright Division Emhart Mfg. Co., Hartford, Conn.

## outstanding performance

...CUTS  
CUTTING TIME  
**50%**

This Cincinnati Bickford Super Service Radial was installed to save time, increase production and to handle new and larger work. Forty holes are being drilled in this five ton casting with diameters from 7/8" to 1-3/16". With the installation of this new Cincinnati Bickford Super Service Drill, drilling time was reduced 50%. The remarkable ease of handling of this large Radial was a major factor in the increased production.

Write for catalog R 29 for information on these productive drills.

.... **CINCINNATI  
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

.....  
**THE CINCINNATI BICKFORD TOOL CO.**

Cincinnati 9, Ohio, U.S.A.

## Dates to Remember

### Meetings

#### JULY

**TRUCK TRAILER MANUFACTURERS ASSN.**—Annual summer meeting, July 23-24, Edgewater Beach Hotel, Chicago. Association headquarters are at 1024 National Press Bldg., Washington.

**NATIONAL TOOL & DIE MANUFACTURERS ASSN.**—Summer meeting, July 30-Aug. 1, Milwaukee. Association headquarters are at 907 Public Square Bldg., Cleveland.

#### AUGUST

**WESTERN ELECTRONIC SHOW & CONVENTION**—Aug. 19-21, Civic Auditorium, San Francisco. Headquarters are at 1355 Market St., San Francisco.

#### EXPOSITIONS

**NATIONAL METAL SHOW**—Oct. 19-23, Cleveland.

**NATIONAL AUTOMATIC MERCHANDISING ASSN.**—Convention & Exhibit, Aug. 23-26, Conrad Hilton Hotel, Chicago. Association headquarters are at 7 S. Dearborn St., Chicago.

#### SEPTEMBER

**ELECTROCHEMICAL SOCIETY**—Fall meeting, Sept. 13-17, Wrightsville Beach, N. C. Society headquarters are at 235 W. 102nd St., New York.

**NATIONAL PETROLEUM ASSN.**—Annual meeting, Sept. 16-18, Traymore Hotel, Atlantic City, N. J. Association headquarters are at Munsey Bldg., Washington.

**NATIONAL FOUNDRY ASSN.**—Annual meeting, Sept. 16-18, Plaza Hotel, New York. Association headquarters are at 53 W. Jackson Blvd., Chicago.

**PACKAGING MACHINERY MANUFACTURERS INSTITUTE**—Annual meeting, Sept. 20-23, Skytop Lodge, Pa. Institute headquarters are at 342 Madison Ave., New York.

**TRUCK BODY & EQUIPMENT ASSN., INC.**—Sept. 21-23, Sheraton-Gibson Hotel, Cincinnati. Association headquarters are at 1122 Dupont Circle Bldg., Washington.

**AMERICAN MINING CONGRESS**—Metal and Nonmetallic Mineral Mining Convention, Sept. 21-24, Olympic Hotel, Seattle. Headquarters are at 1200 18th St., Washington.

**INSTRUMENT SOCIETY OF AMERICA**—National Instrument Conference and Exhibit, Sept. 21-25, Chicago. Society headquarters are at 1319 Allegheny Ave., Pittsburgh.

**NATIONAL ASSN. OF FOREMEN**—Annual convention, Sept. 23-26, Milwaukee. Association headquarters are at 321 W. First St., Dayton.

## Does the wire rope you use win this kind of praise?

"I have preferred Hercules Red-Strand wire rope since 1909," says an operations superintendent. "I just wouldn't use any other." Another operator reports a truly remarkable record: "Red-Strand outlasted any other rope by three times!"

### HERCULES Red-Strand earns it

Why do these men, among others, praise Red-Strand so highly? In a few words, it's because *higher-than-rated quality* in Red-Strand wire rope means *longer-than-expected service*... year in, year out.

Next time, use Hercules Red-Strand. You'll experience the difference too.

HERCULES<sup>®</sup>  
Red-Strand wire  
rope made by  
A. Leschen & Sons  
Rope Company,  
St. Louis 12,  
Missouri

In business only to  
make wire rope  
... better wire  
rope... since 1857

**LESCHEN**  
**WIRE ROPE  
AND SLINGS**

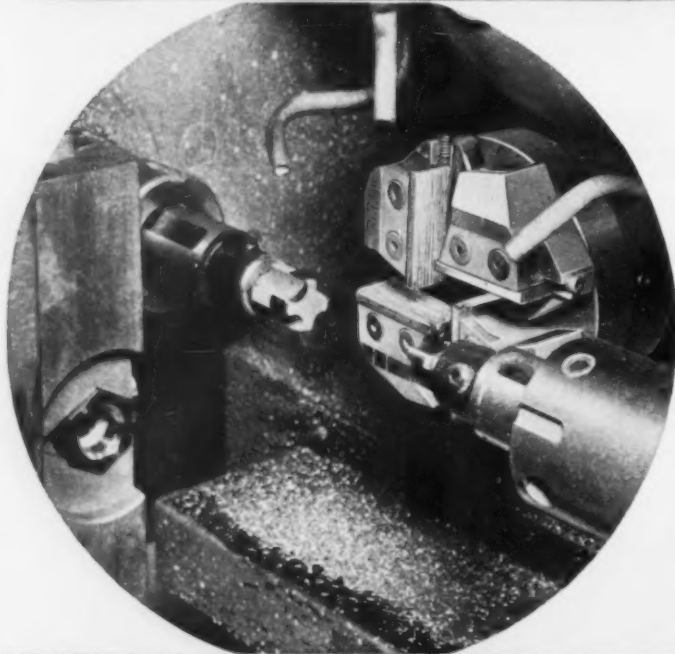
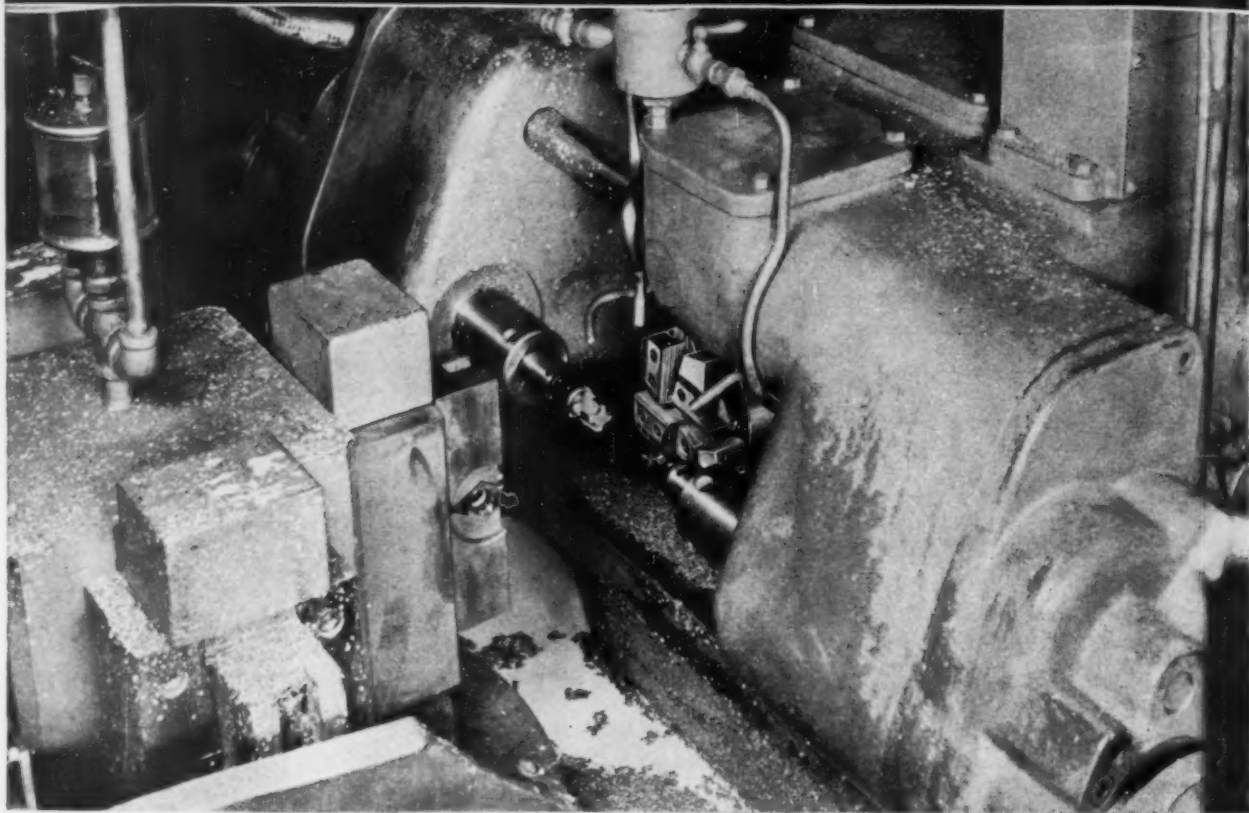
HIGHER-THAN-RATED QUALITY

A. LESCHEN & SONS ROPE COMPANY

DISTRIBUTORS IN ALL PRINCIPAL CITIES

# 57% Less Threading Cost

## ON AUTOMATIC CHUCKING MACHINE



**A** LANDIS Solid Adjustable Die Head cut the cost of one threading operation in the plant of a large Middle Western manufacturer by 57%.

The operation, performed on a Goss and DeLeeuw Automatic Chucking Machine, required the cutting of a 1 11/16" diameter 14 pitch thread 1/2" long on cast brass valve bodies. Prescribed tolerances were easily maintained.

The LANDIS Head fit perfectly into the highspeed cycle of the chucking machine, and produced an average of 210 finished pieces per hour, revolving at 385 RPM. Major factors in the efficiency of this LANDIS Head were low down-time and low tool cost, occasioned by long tool life. Output of finished pieces averaged from 4,000 to 5,000 between chaser grindings.

Please send job and machine specifications with your request for additional information.

THE **LANDIS Machine CO.**



WAYNESBORO  
PENNSYLVANIA



## THE IRON AGE Newsfront

**GROWING USE OF RAILROAD FLATCARS** to haul highway semi-trailers presents loading problems. Trailers are usually rolled on to a string of cars, circus-fashion. Now, at least one lift truck maker is working on a 90,000-lb fork truck for side loading.

**ULTRASONIC TESTING HAS BEEN IMPROVED** by using a liquid searching unit in place of other piezoelectric materials. The liquid "schnozzle" consists of a water column in a plastic tube. It combines advantages of contact and immersion methods, has practically eliminated crystal wear. It spots defects  $\frac{1}{8}$ -in. below an aluminum surface.

**SOLDERING ON CERAMICS** is now being done by applying a silver paste to the ceramic material, then heating in a kiln to form a positive bond. Copper and tin plating follow. So far the process is being used primarily for insulators for hermetically sealed transformers.

**TRANSISTOR SEAL HEADACHES** plaguing the industry may have been ironed out. Production is about to begin on transistors with ceramic seals. Tests indicate the ceramic seal may greatly extend transistor life by excluding moisture.

**FIRST SIGN OF MORE COMPETITIVE CONDITIONS** in steel will be freight equalization. Base prices would remain unchanged unless the situation really became serious. Absorption of freight to maintain competitive position will be done with extreme caution to avoid run-in with the Justice Dept.

**EXEMPTION FROM THE CURRENT SURTAX RATE** on corporate income may be raised next year from \$25,000 to \$50,000, or even \$100,000. Congress is finally waking up to the idea that the higher limit would permit growing businesses in the small or medium bracket to become effective competitors for their larger rivals.

**CONGRESS IS ALSO GIVING THOUGHT** to the proposal which would permit tax credits for the first \$25,000 or \$50,000 which is reinvested in machinery and other capital equipment.

**SOME NEW TOLL ROADS** aren't carrying the traffic needed to bring builders up to the breakeven point. Minimum number of cars or trucks is figured to be 5000 per day and some roads aren't being used that much.

**HIGH SPEED MOTION PICTURES** have given research engineers a new and effective research tool for analysis of problems involving movement of machine parts. It has proved particularly valuable in finding bugs in malfunctioning machinery which do not show up in normal testing methods.

**COMBINATION OF MAGNETIC FEEDING** devices and hand loaded indexing dials has greatly increased production in restrike operations while making the operations more safe. One dial has plastic blocks contoured for fast, easy loading. The combination, used with air ejection units, has greatly boosted press production rates.

July 9, 1953

# What's Screwy?

by Phillips



"Oh, he's not so smart. It's just that those Phillips Screws are so easy to drive."



**PERFECTLY  
MATED!**

Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

**EASE** of driving is only *one* big advantage. Phillips Screws save time, work and money. They also add structural strength, set up tighter, resist the loosening effect of vibration. And they eliminate driver skids,

damaged parts and split screw heads. The identifying X on the cross-recessed-head identifies the x-tra quality of Phillips Screws instantly. Be sure to state "Phillips" on the specifications.

## PHILLIPS *Cross-Recessed-Head* SCREWS

**X** marks the spot... the mark of extra quality

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.  
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY  
ELCO TOOL AND SCREW CORPORATION • GREAT LAKES SCREW CORPORATION • THE H. M. HARPER CO.  
THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY  
THE NATIONAL SCREW & MANUFACTURING CO. • PARKER-KALON CORPORATION  
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.  
SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHWORTHING HDWE. MFG. COMPANY  
STERLING BOLT COMPANY • STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.



TODAY'S... AND THE FUTURE'S... FINEST FASTENER

# FARM EQUIPMENT: Sales Rate Rebounds

**Second quarter buying of agricultural implements refutes gloomy predictions . . . First period losses liquidated . . . Buying returns to seasonal patterns—By K. W. Bennett.**

Farm equipment sales have confounded the pessimists. Ailing badly in first quarter, they snapped back to robust health in the second period.

Industry sales had been 15 pct under 1952 levels in the Jan.-Mar. period, but at least three producers have now liquidated their losses. Another company topped first quarter sales by an additional 10 pct.

## Can Equal '52

It's admittedly the customers who call the turn these days, as buying reverts to pre-World War II seasonal patterns. But sales are staying high. Retail sales in May were \$252 million. That's still under the \$268 million figure for May 1953, but is \$18 million over April of this year.

Final June figures will probably show the sales dip customary

when farm equipment sales follow their normal seasonal pattern. But long range forecasters feel that the overall success of second quarter operations makes it possible to equal 1952 records.

## Tractors Move Slowly

Two factors have been affecting the farm equipment dealer already. Drought in a few areas within past few weeks has locally held sales down. But, on the other hand, with credit tightening, a number of independents haven't been able to float any large equipment purchases. Not many have been paying upkeep on bloated inventories.

Farm equipment generally is moving at a better pace than tractors. It is no secret that tractor production in the industry has been cut back at least 15 pct in the last 60 days. One major producer has cut output 25 pct in one plant. But this is partly because spring selling season is past and demand won't be heavy again until autumn.

## Still Good Year

One producer is now 8 pct behind last year's tractor sales for first and second quarters. He is confident he will wipe out that 8 pct deficit in August, and September sales will push them above last year's level.

A few guessers have estimated that, when the smoke clears, overall equipment sales for 1953 will have run 5 to 10 pct below 1952's record high. Even that dropoff would make 1953 one of the top selling years, and place 1953 retail farm equipment sales above the 1951 figure.

Some dealers who came into business during the war years are a little panicky. They are accustomed to low inventories and heavy consumer demand. They aren't familiar with the pattern of the '30's, when inventories were customarily much higher and the farmer didn't buy until the morning of the day he needed the equipment.

When farm equipment people reaccustom themselves to that type of selling, the old hands say, they'll realize that present inventories are not excessive, sales prospects not dark. A few companies will exceed even 1952 sales levels.

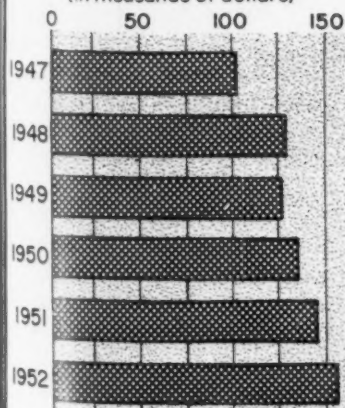
## Ignore Dealer Orders

While the retail dealer is a fair barometer of the coming farm equipment market, he is not infallible. For instance, one company reports that firm dealer orders for August are definitely off. And they report that his or-

## Farm Equipment Sales

### AVERAGE SALES VOLUME PER RETAIL DEALER

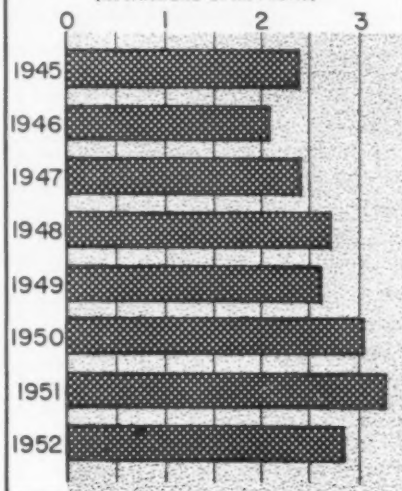
(in thousands of dollars)



## Farm Steel Use

### STEEL CONSUMED BY AGRICULTURE

(in millions of net tons)





## ABRASIVES: No Worry Over Sales Dip

**Abrasives producers won't worry over predicted second half sales dip . . . Seasonal slump customary, and current business is at peak . . . Overall outlook good—By G. G. Carr.**

Abrasives producers aren't getting very upset over the predicted second half dip in business of 12 to 15 pct. First half sales have been running at 1952's peak levels, and a seasonal third quarter dip is customary.

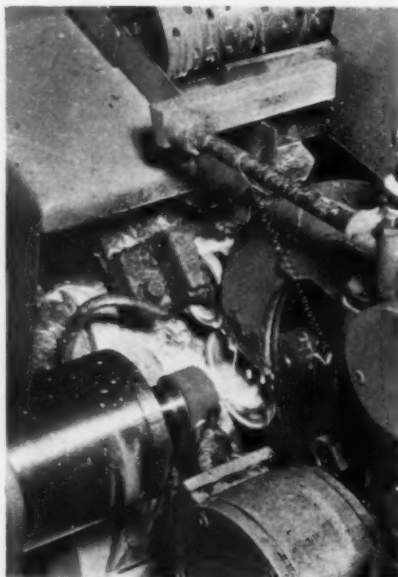
Detroit, always one of the largest abrasives customers, slows its buying during the model changeover period. Farm equipment manufacturers traditionally hit production peaks in late winter, early spring, then taper off. And this year their business is slow, even for the summer months.

### Foundry Sales Sluggish

Growing tendency to close plants completely for vacation periods is showing up in abrasives sales. Norton Co. reports its customers step up their buying just before shut-downs to build up inventories against reopenings. Purchasing is naturally not resumed until inventories return to normal levels.

One fly in the ointment has been sluggish foundry sales. Foundry business is already poor to downright bad, and obviously won't pick up during vacations.

But the overall abrasives picture looks good for some time to come. The industry has traditionally been



ABRASIVES are playing an ever increasingly important role in industrial production.

a sensitive barometer for general industrial activity.

Even the smallest shop has a grinding wheel, and any business spurt will bring demand for more grinding capacity. Conversely, a slump in a basic industry like steel means a time of troubles for abrasives makers.

Total value of abrasives shipped in 1947 was \$240,741,000 according

to U. S. Census Bureau figures. Defense expansion boosted this to \$324,713,000 after Korea in 1950 and to \$384,016,000 in 1951.

### Sure of Good Market

Final totals aren't yet available for 1952, but will be still higher. Present defense volume will hold at current levels for at least 6 months after any cutbacks which may be made, trade sources say.

And with industrial expansion expected to hit a whopping high of \$28 billion in 1953, abrasives makers feel assured of a good market.

Even when expansion falls off, competition will pressure manufacturers to modernize equipment for more efficient production. Abrasives makers are carrying on intensive research to meet this demand.

### Diamonds Stay Tight

Raw materials are generally in excellent supply. Diamonds and bort are still tight, but Norton Co. spokesmen say demand is no longer as desperate as it once was. They attribute this in large part to industrywide education on better use and salvage methods.

But, they stress, no completely satisfactory substitute for diamond wheels has yet been found. Silicon carbide paper belts, developed jointly by Behr-Manning Corp. and Fendlin Engineering Co., (THE IRON AGE, Dec. 25, 1952, p. 25) have proved valuable in finish grinding tungsten carbide cutting tools. But roughing must still be done on diamond wheels.

## Special Report

*Continued*

dering for third and fourth quarters of this year is not so optimistic as in the past 2 years.

On the other hand, the company officials in offhand conversation ignore dealer orders entirely. Says this producer, "Everybody in the company knows we're going to have one of our best years."

This viewpoint is increasingly common. Pressure from farm equipment producers for mill steel will be stronger than expected. There have been no cancellations

of mill orders by farm equipment producers to date. With the business upswing it is entirely possible that their third quarter demand for steel will be stronger than was previously thought possible.

Return to a normal buying pattern in farm equipment (heavy buying in spring and fall with little business in winter and summer) is producing a change in the farm equipment manufacture. To offset his seasonal lows he's begin-

ning to manufacture everything from chintz-covered iceboxes to heavy construction equipment.

Indicative of the trend was International Harvester's recent purchase of a lift truck concern, and the announcement last week that Allis-Chalmers and Buda Co. would merge.

These moves, and the current upward movement in farm equipment sales, mean that farm equipment producers will be hard after steel in third quarter.

## TITANIUM: New Process Leaves Lab

**Research firm is building pilot plant for electrolytic reduction of titanium dioxide . . . Early cost estimates put price at "under \$1.50 per lb"—By R. L. Hatschek.**

Much hard work has been going into the search for a less expensive way to produce metallic titanium. One electrolytic process, now emerging from the laboratory of United International Research, Inc., may be the answer.

Titanium is now priced at \$5 per lb. Present indications are that the process may be able to produce metal for under \$1.50 per lb, according to Alfred R. Globus, president of the firm. At this price titanium would still be expensive compared to commercial metals but it would be a long step closer to uses now prohibited by the \$5 price.

### Would Have Many Cells

Cost estimates are based on a 50-ton-per-day plant which would be built using data from a pilot plant now under construction. The pilot plant will consist of a single electrolytic cell capable of producing 3000 to 5000 lb of titanium per year.

A commercial plant would consist of a large number of these, identical to the pilot cell, connected in series-parallel. Each battery, made up of 12 cells, is rated at about 50,000 lb per year.

### Describes Process

In the process, titanium dioxide ( $\text{TiO}_2$ ) is dissolved in a fused salt bath at the fairly low temperature of  $700^\circ\text{C}$ . The cell is sealed with an atmosphere of inert gas, such as argon or neon, mixed with a small amount of vaporized electrolyte.

After the electrolysis is complete the electrolyte is tapped off to the level of the titanium. The residual mixture of titanium sponge and electrolyte, now cooled to a "mushy" state, is scooped out and the electrolyte is dissolved off by cold water.

It's not a continuous operation.

Rather it is a long-run batch process.

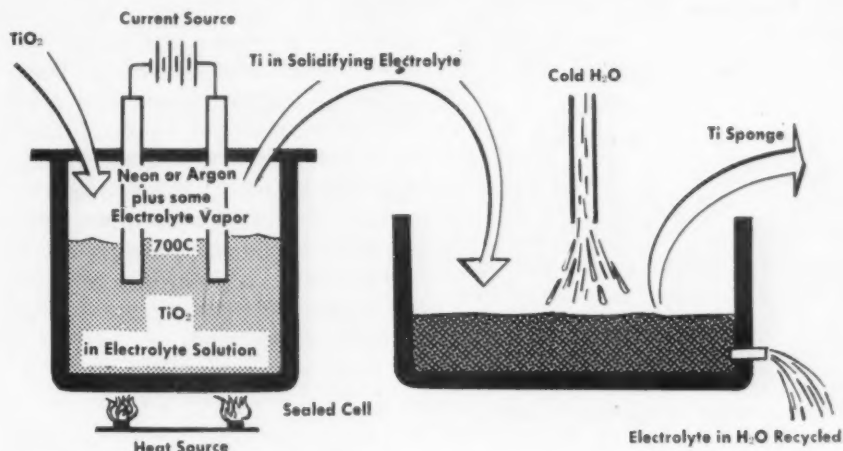
Laboratory production has been in about 50-g lots. Energy consumption has been about 12 to 13 kwhr per lb of titanium produced, although it's expected this requirement will be cut to about 10 kwhr per lb in the pilot plant. Not much hope is held for any further

This was obtained when 99.9 plus pct  $\text{TiO}_2$  was used. Further refining of the oxide is the only way to improve final metal purity.

Because the patent applications have not yet progressed far enough, Mr. Globus would not disclose the composition of the electrolyte, the cell itself, or the anode. He did say, however, that at  $700^\circ\text{C}$  the electrolyte is very fluid, a good conductor and only slightly volatile. Since it attacks many materials, considerable research went into finding one from which to make the cell.

Development work has now progressed to the point where a pilot

## Electrolytic Titanium Process



reduction in energy needs. But with a total cost of at least \$1.15 per lb, the cost of electricity is only a minor consideration.

These lab batches have run about 99.5 pct pure, with maximum impurities of about 0.1 pct nitrogen, 0.1 pct oxygen, some iron and silicon and traces of a few other elements. Nitrogen and oxygen content must be watched carefully or the metal will be brittle but the other impurities present few problems.

The raw material, which is fed into the cell at the same rate it is consumed, is a dry, refined  $\text{TiO}_2$  of about 99.5 pct purity. This is obtained by refining a frit grade of  $\text{TiO}_2$  which runs 95 to 98 pct pure.

Best laboratory run to date resulted in 99.8 pct pure titanium.

plant is needed to prove the process commercially practical. The pilot plant is scheduled for initial operation sometime late in October.

### Have Four Offers

The research firm has already received four firm offers to license the process, provided it proves practical in the pilot plant stage. Mr. Globus states that these companies are all in the titanium processing business already, though he would not further identify them.

But even if it proves commercially practical the search for a continuous process will go on. Many feel that a continuous method will be the only way to cut prices to a level where titanium can prove its potential.

# AIR FREIGHT: Machinery Flies High

**Manufacturers find it pays off . . . Becomes top revenue cargo item for airlines . . . GM has flying conveyor between Detroit and Boston . . . Freight rates comparison—By T. M. Rohan.**

Machinery is flying high these days.

In the early postwar years shipment by air was reserved for emergencies when cost was secondary. But now it has become the top revenue cargo item for airlines flying to the West. Equipment producers find it pays off.

Steadily increasing air shipment of machinery, especially to California, has made it almost routine. Last year it represented \$870,000 for United Airlines into San Francisco alone. And shipments this year are running 5 pct ahead of last year.

## Flying Conveyor Belt

United now has ten all-cargo flights weekly between California and the East. Ten DC-4's capable of carrying up to 8.5 tons are kept in constant service. And these carry only half the volume, the remaining going as cargo on regular passenger flights.

In the East, American Airlines

has set up a 700 mi. flying conveyor belt between Detroit and Boston. Two tons of auto fenders, chassis, wheel assemblies and door handles are shipped daily from General Motors at Detroit to the Framingham, Mass. assembly plant. The daily operation takes only 8 hrs from the Detroit loading ramps to waiting trucks at Boston.

American last year carried 47 million ton miles of air freight with revenues nationally of \$10 million or about 23 pct of all U. S. domestic trunkline airfreight.

Western markets have been linked to eastern production centers by a matter of hours. Industries have put new products in the market place 2000 miles away the next morning. This has been done on new television speakers, small generators, transistor powered wrist radios, motor parts and packing machinery.

## Payload in Electronics

Other passenger lines are also heavy carriers. The non-skeds such as Flying Tiger and Slick Airways and irregulars such as Transocean get their share. These generally cater to large single firms and lease extra planes for special flights.

Major machinery item air-shipped to the West is electronic equipment. Its comparatively light weight keeps the bill down and its delicacy makes air shipment advantageous. The heavy growth of the California electronics industry, especially for military planes, promises an even greater future.

Emergency shipments of heavy machinery still constitute a big part of air freight. The largest single piece to leave San Francisco was a 5.5 ton Oakland-made diesel engine crankshaft for a

fishing boat in Philadelphia. The shaft left San Francisco on a regular flight at 10 p.m. on a Monday and arrived in Philadelphia at 4 a.m. on Wednesday with mail and freight stops at Denver and Chicago. The boat owner gladly paid the \$1100 bill to get back to sea while the fish were still biting.

## Planes Specially Equipped

Hawaii also represents a major target for air freight. Sugar mill and pineapple cannery machinery can't wait for ship transport during their short season so most emergency parts go by air.

As air freight has gone up, most planes have been specially outfitted for better cargo loading and handling. The newest Douglas DC-6C, announced 2 weeks ago, has a convertible interior. It can be changed from a 76 passenger liner to a 13 ton cargo ship in minutes by movable bulkheads and folding seats.

Regular DC-6-A cargo versions of DC-6 transports have hydraulically operated 10 ft. side let-down doors which double as loading ramps. For many years weight was the limiting factor in air transport. But planes like the DC-6 with 9600 hp can generally lift anything you can get into them.

Most obvious deterrent to air freight has been cost. But this



ELECTRONIC COMPUTER is unloaded at Los Angeles Airport after flight from New York.



SPECIAL ELECTRIC winch and a swinging boom speeds loading of a freight plane.



has remained remarkably constant as increased volume offset added costs. A 10 pct rate increase went into effect in 1951, the first in 4 years.

To ship a ton of machinery by regular air freight from San Francisco to New York costs \$16.10 per 100 lb, f.o.b. By rail it is about \$7.59. Air delivery is about 2 days while rail freight is about 3 to 4 weeks.

Independent non-scheduled and irregular carriers generally fix rates individually.

The San Francisco airport last year handled 38.5 million lb freight and this year expects 8 pct more or 41.5 million. Neighboring Oakland airport is also hitting 18 million lb. To help handle San Francisco business a new \$10 million terminal is being built for completion this year.

## Center for Maintenance

Being a hop-off place for the Pacific and Alaska and terminus for transcontinental runs, the West Coast has blossomed as an aircraft maintenance center. United's \$7 million San Francisco maintenance base employs 1900 and is currently undergoing a \$2 million expansion with \$7.5 million more in the planning stage.

In Los Angeles the International airport has become the hub for a husky segment of aircraft metalworking. What was a bean field on Sepulveda Ave. 25 years ago now employs 40,000 in direct and allied industries with \$250 million annual payroll and 55,000 within a quarter mile of the airport.

Los Angeles airport currently ranks second nationally in air express handled. Freight handlings last year hit 21,000 tons, an increase of 206 pct over '47.

The \$13 million Seattle-Tacoma airport is a jumping off point for much Alaskan, Hawaiian and Orient trade with outgoing freight triple that of incoming. Air freight there and at Boeing field last year jumped 25 pct to 7301 tons and this year is running 19 pct ahead of 1952 on freight.



PROTECTIVE CLOTHING enables workers to move in close to hot metal (2900°F) streaming from openhearth. Coats of fire resistant fabric are aluminum lined to reflect heat.

## Flameproofed Clothing Protects Workers

A special chemical treatment for clothing is making industry's hot jobs safer for workers. Treatment prevents clothing from bursting into flame, even when exposed to intense heat. And treated garments can be washed repeatedly without losing protective properties.

Flameproofing compound, called "Permaproof 300," was developed by Treedale Laboratories & Textile Processing Co., Pittsburgh, after nearly 20 years of research. Several million yards of treated cloth have been put in use by industry.

One of the first industry proving grounds for the protective clothing was the Pittsburgh Works of Jones & Laughlin Steel Corp., where "excellent results" are reported after 5 years of testing. The flameproofed garments are now being used in other steel mills and industries where fire and intense heat present working problems.

A special heat reflecting coat has also been developed. In addition to being flameproofed, it has an aluminum foil innerliner which provides up to 80 pct heat reflectivity. Wearing this coat, steelworkers are able to enter a furnace that has been cooled to 700-800°F and stay as long as 3 minutes making repairs. With conventional protective garments they could stay a maximum of 15 seconds.

The flameproofing compound is impregnated into the fiber of cloth during final finishing in a textile mill. No special equipment is needed. Porosity of the cloth is not noticeably affected. Tensile strength and abrasion resistance are increased.

The firm has filled a number of government orders for flameproofing tent liners and mattress ticking. It is now expanding facilities to treat a wide line of civilian goods including mattress covers, upholstery and drapery fabrics.

At a demonstration in New York last week impregnated cotton fabrics were subjected to flames from blow torches without bursting into flame or showing afterglow when the torch was removed.

# New Pickling Inhibitor Preserves Surface During and **AFTER** Scale Removal

*Houghton "Acitrol 3129" effective across-the-board . . . assures minimum breakdown over long periods at high temperatures!*

## SAVES STEEL AND ACIDS

This new liquid inhibitor does the vital job of protecting the metal against acid attack after the scale is removed as well as during the operation. Acid is conserved while the steel is preserved. Acitrol also prepares the surface for good coverage of subsequent finishes.

## RESISTS BREAKDOWN UP TO BOIL

Houghton Acitrol 3129 maintains its effectiveness over the full temperature range—resists breakdown even in pickling installations run at long periods over 200° F. This means you can benefit through the increased production rates Acitrol makes possible. And low temperature baths may be maintained effectively even if less inhibitor is used.

## USED ACROSS-THE-BOARD

This fast-dissolving liquid works well in either sulphuric, hydrochloric or phosphoric acid baths. Whether the acid dilution is mild or strong, Acitrol 3129 does the job. It requires no pre-mixing. Picklers find it convenient to use.



## STAYS STABLE IN STORAGE

Add Acitrol 3129 to concentrated acid, hold it in storage, and you'll find it ready for effective protection when you want to use it. It remains stable. It stays uniform from batch to batch.

## YOU BENEFIT COST-WISE, TOO

Acitrol's stability, efficiency and ability to conserve steel and acids are all indications of its low cost per ton of steel pickled. Houghton Acitrol 3129 is available in 15, 30, and 55 gallon drums and well worth a trial. Get prices and further information from your Houghton Man or write E. F. Houghton & Co., 303 W. Lehigh Ave. Philadelphia 33, Pa.

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BULLETIN

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Acitrol  
3129

ACITROL 3129 product of



Ready to give you  
on-the-job service . . .

## Manufacturing

### Television:

**FCC okays 398 new stations . . . Paves way for TV boom.**

Since lifting of the freeze on TV station building a year ago, Federal Communications Commission approval of permits for 398 new stations has laid a solid groundwork for a future video bonanza.

Adding the 108 pre-freeze stations brings the total to 506 in all states and territories except Vermont (two applications pending), Hawaii and Puerto Rico. And there are about 600 more applications awaiting the FCC stamp of approval.

Stations already approved will be located in more than 300 cities, will bring most of the continent's population within range of at least one station. This will provide a significant boost marketwise for manufacturers of television sets.

### Set Output Record

When a local television studio beams its first program the rush is on for television sets. Manufacturers prepare by stocking dealers up to the rafters. Meanwhile such established TV cities as New York and Chicago are pretty well saturated and sales move sluggishly. The sales difference between a new TV city and an established center is staggering.

And this new demand will be added to a market that has called for record output during the first 5 months of this year. Television set production was 3,309,757 units for the period, highest ever recorded for the January to May period, according to Radio-Television Manufacturers Assn. During the same 1952 period only 1,957,083 video sets were made.

Sales of receiving and cathode ray tubes dipped seasonally in May but remained well above the May 1952 figure. Total sales of cathode ray tubes by manufacturers during the month were estimated at 744,252.

## BEAMS: Prestressed Field Growing Up

**Volume of prestressed concrete building climbs 200 pct per year . . . Await results of railroad tests . . . Differences between prestressed and poststressed—By K. W. Bennett.**

Still a relative newcomer to the U. S., the prestressed concrete beam is coming of age—fast. One source last week told THE IRON AGE that volume of prestressed concrete building was increasing by 200 pct per year. It is booming here and abroad.

A Belgian steel mill is currently producing 1000 tons per month of the special high tensile wire used in concrete prestressed beams, for use in Belgium only.

For producers of prestressed beams, another market may unfold rapidly this fall, when railroad tests are completed on the building material. The railroads will conduct tests on a standard reinforced slab, a slab built on the ultimate load theory which requires that slab depth be reduced and more reinforcing bar added to equalize the stress on both slab and bar.

### Prestressed and Poststressed

Tests will also be conducted on a prestressed slab. Prestress engineers regard the test results as a foregone conclusion and they may be right. One railroad has already made arrangements to construct a railroad bridge employing prestressed beams.

Generally, prestressed concrete beams fall into two major classes—the prestressed beam and the poststressed. The prestressed requires stretching high tensile strength wire (one specification calls for 268,000 psi) along the bottom of a concrete pouring form. The wire is seven strand—as many as 75 of .25 in. diameter. Creep must be virtually eliminated and one type of wire is guaranteed at less than 6 pct creep at 70 pct of ultimate tensile strength.

Paper sausages are inserted in the form to give the finished beam either one or two holes running the length of the beam. The concrete is poured, allowed to set, the

protruding wires are trimmed off, and the prestressed concrete beam is then ready for shipment.

### Spans Up to 50 Ft

A number of engineers favor the prestressed beam rather than the poststressed type because as much as 500 ft of prestressed may be poured at one time, or as great a length as floor space allows. Dividers in the long form split the long beam into the lengths desired. One such beam, designed for a center load at the center of the span of 23,000 lb, held up to 74,990 lb before failing. Even then, the wire in the beam gave no evidences of creeping.

Prestressed beams have been recommended for spans up to 50 ft and have gone as high as 65 ft.

### Eliminate Ceiling Support

For longer spans, poststressed beams are generally being recommended. These cost slightly more than the prestressed beam, but have been used in lengths up to 120 ft.

In a poststressed beam, plastic tubes are placed in the pouring form and concrete is poured around them. When the concrete has set, the reinforcing wire is threaded through the holes, is put under tension, and is anchored at

each end. Again, high tensile wire is used, seven strands, in diameters of .192 in. or .25 in., or .276 in. diam.

One source recommended tensile strengths of 235-240,000 psi per single wire. The end anchors are a cost factor in the poststressed beam, though in at least three new construction jobs (one bridge, one parking garage, one public building) poststressed beam bids took business from steel beam bidders.

### Beams for Housing

Indicative of the many budding markets, experiments were begun recently on 30 ft beams to be used in housing units. The concrete beam construction eliminated a number of ceiling supports, with the result that the landlord could move his partitions to suit the whims of successive tenants. Similarly, there has been increasing attention paid to the use of long prestressed beams in industrial and commercial firms.

The prestressed concrete beam is keeping no one in the structural steel business awake nights, nor do high tensile wire sales bulk overly large. But prestressed has a market that is growing rapidly.

### Hotel Building Booms

Getting ready for a record flow of tourist traffic, builders are putting up hotels and motels at a much faster pace than last year. In the months January-May, when the weather was bad in many sections, the increase was about 56 pct above the 1952 rate.

## Fabricated Structural Steel

### Contracts, Shipments, Backlog

	Estimated Net Tons		
	1953	1952	Avg. 1947-1950
<b>CONTRACTS CLOSED</b>			
May	306,319	209,888	176,266
Year to Date	1,317,802	1,089,330	889,640
<b>SHIPMENTS</b>			
May	265,000	244,222	198,426
Year to Date	1,286,588	1,235,077	910,664
<b>BACKLOGS</b>	2,178,918	2,263,443	1,192,401

Source: American Institute of Steel Construction



## GUARDS: Vital For Plant Protection

**Adequate plant protection service is major factor in safeguarding industrial property . . . Independent service prevents management headaches . . . How it works—By R. D. Raddant.**

Specialized problems of protecting industrial property have made the plant protection system an important factor in any industry.

Scarcely any plant of size can afford to be without a protection system that not only guards the property from theft, fire or other damage but also handles the complex problem of internal security. The latter is particularly important in these days when defense contracts are the rule rather than the exception.

### Relieves Headaches

Larger industries often have their own plant protection systems. But even some of the largest and most smaller plants prefer to retain independent services on a contract basis.

Big advantage of retaining the independent service is relief from the headaches of hiring experienced personnel, setting up the protection system, inaugurating a training system for a uniformed and possibly armed force, and the multitude of incidental tasks that accompany setting up a "police" force.

### Security Forced Changes

Then, too, there is a distinct advantage in having policing done by an independent service which has the definite clauses of a contract to live up to. It avoids the idea of a company gestapo that might be suspected of having other interests besides protecting life and property.

Plant protection has mushroomed since the start of World War II. Prior to that time, when defense work forced introduction of security measures, many comparatively large plants relied on a loose system of watchmen, no longer practical in these times. Also, plant protection requirements generally exceeded the

limits of regular police authority, making an internal service mandatory.

When retaining a protective service take the advice of Capt. A. J. Maes, director of operations for Watts & Whelan Co., a Detroit plant protection service with 42 years behind it.

"No one should retain a service without fully investigating it for its reliability," he warns.

Most reliable organizations carry workmen's compensation for their employees and comprehensive public and liability insurance. All employees are finger printed and screened by the city police, state police and the Federal Bureau of Investigation.

### What They Do

Many of the organizations are approved for guarding U. S. defense plants, obviously a good recommendation, particularly if defense work is a part of the retaining company's work.

Large protective organizations are equipped to handle a plant of almost any size. Watts & Whelan, for instance, serves such companies as Bohn Aluminum & Brass Corp., American Blower Corp., Fruehauf Trailer Corp. and other large Michigan corporations.



What will plant protection provide? It depends on the terms of the contract, but almost any function of a protective nature can be provided.

Large services have their men trained for fire protection as well as protection against theft and other property damage. If guns are required, they are experienced in their use.

### Tailor Made Precautions

When a service takes over any given company, it may first set up a badge and card system as well as a pass system if for any reason movement among departments is restricted. Sabotage is carefully guarded against.

Movement of tools and clothing is checked. Some plants permit the inspection of lunch boxes while others feel this is an infringement. This usually depends on the type of plant, whether or not transient employees are retained, and other local conditions.

Another essential of a good plant protection service is cooperation with police. Plant protection men are not allowed to make arrests, so mutual trust and cooperation are necessary for successful results.

### Shy Off Labor Strife

Larger services provide specialists for specific problems. For example, many plants have saved thousands of dollars on their scrap contracts through their plant protection service.

In the past the stigma of strike-breaking and labor spying was sometimes attached to some agencies. Today most reputable services will not touch a labor problem. They will not take over protection of a plant when a strike is in progress and will not engage in any labor activity.

However, investigators can be provided for specific cases where illegal activity is suspected. Many rackets have been exposed by alert protection services.

In short, the function of a service can do a lot more than provide a guard with an imposing uniform on the gate.

# TOOLS: Order Backlogs Are Vanishing

**European machine tool backlogs have dropped 40 pct since last year . . . Marked decline in defense spending . . . Prices falling . . . Builders revert to simpler tool designs.**

Market for European machine tools is entering the wrong end of toolbuilding's traditional feast or famine cycle. Since last July, foreign tool builders' backlogs of both domestic and export orders have dropped almost 40 pct, and there is no sign of slowing.

Showing the effect of decreased demand from the U. S., export backlogs have suffered a proportionately greater loss than domestic backlogs.

A year ago, West Germany, France, Switzerland and Italy had export orders for \$280 million worth of machine tools. On June 1, 1953, unfilled export orders were estimated at \$156 million, a drop of 44.3 pct.

## Four Months to Go

Backlogs of domestic orders in the West European countries during the same period have dipped 35.8 pct from \$438 million to \$281 million. And combined domestic and export backlogs have declined from \$718 million to \$437 million.

West Germany, with backlogs rated at \$209 million, is one of the leaders on the Continent, but if current production is continued German toolmakers will be scraping bottom in 4½ months. France, with a \$115 million backlog, can keep going for 7 months; Italy (\$50 million) has sufficient backlog for 6 months' production; Switzerland (\$63 million) has 5 months of orders to work on.

## Prices Dip

An important factor in the decline of machine tool orders has been in the sharp drop in European defense orders. Of machine tool orders booked so far this year, ratio of defense orders to all tool orders is: Italy and West Germany, less than 1 pct; Belgium 2.3 pct; France 5.4 pct; Spain, 6.8 pct; Sweden, 8.3 pct. Only France, Sweden and Spain show an in-

crease from last year.

Many tool builders, especially the Germans, had been hoping for a major surge in machine tool demand as plants retooled to make goods for the European Army, but delays in putting through this program have chilled this potential market at least until next year.

At machine tool expositions held this year at Milan, Vienna, Barcelona, Hanover, Germany and Lyon, France, prices were down 4 to 8 pct from last year's level. Foreign tools seem to be trending toward simpler design, less power, and elimination of gadgets.

Few new types of tools were displayed as the drop in new investments in the European machine tool industry has limited experimentation.

Market for machine tool replacement parts, however, is good to excellent. Many nations undergoing industrial expansion such

as Portugal, Spain, Turkey, India and the Latin American countries rely heavily on parts imports. Spain alone has doubled its imports of replacement parts since last year.

European toolmakers are uncertain about the future. Export firms report an increase in inquiries, but there is no firming of the domestic market.

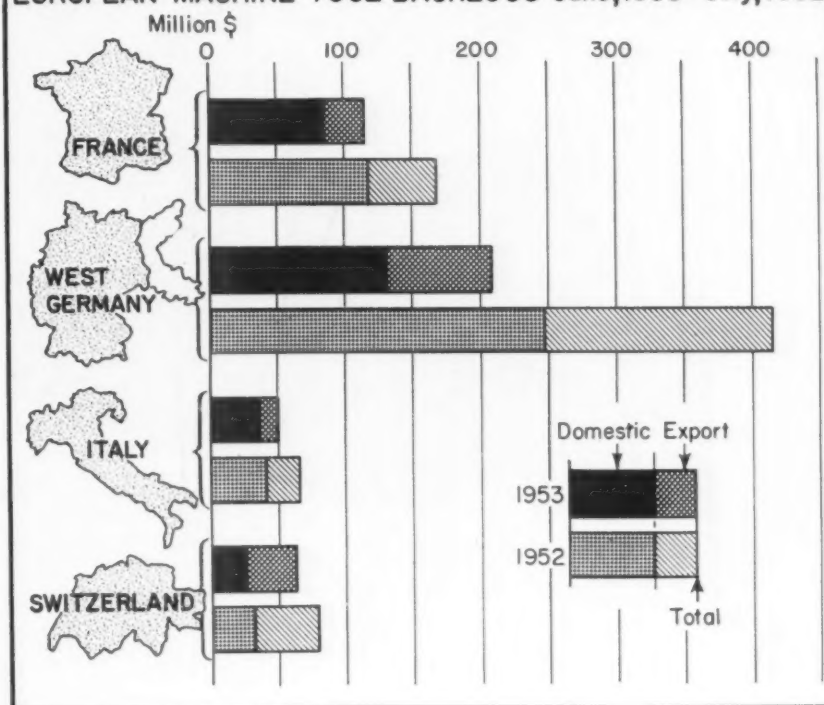
Some builders believe the current situation will change only if Iron Curtain markets are opened up, although informed sources in France and Switzerland are dubious about how strong demand from Red-dominated countries would be.

West Germany, however, regards possible trade with the East as very important. Builders there remember that before the war, Russia and other Iron Curtain countries sometimes imported \$170 million worth of German tools in a year.

## Yugoslavs Study U. S. Mining

A team of ten mining experts from Yugoslavia is half-way through a 6-week study of underground and open-pit mining operations in the U. S.

EUROPEAN MACHINE TOOL BACKLOGS June, 1953 - July, 1952



## Technical Service Data Sheet

### Subject: **GRANODIZING\*** FOR LONG PAINT LIFE ON STEEL

#### **"GRANODINE" FORMS A DURABLE PAINT BOND**

Granodizing forms a crystalline, zinc phosphate coating on steel. This ACP paint-bonding process chemically changes the surface of steel into an inert non-metallic coating made up of thousands of microscopic zinc phosphate crystals.

Granodized steel thus presents a surface much more receptive to paint than untreated steel. Its crystalline structure permits a firm and durable "keying" or bonding of the paint finish. And the "Granodine" zinc phosphate coating itself is actually integral with the metal from which it is formed.

#### **"GRANODINE" CAN BE APPLIED BY DIPPING, SPRAYING OR BRUSHING**

Granodizing can be accomplished by:

- 1 Dipping the work in tanks;
- 2 Spraying the parts in a power washer; or
- 3 Brushing, spraying, or flow-coating the work with portable hand equipment.

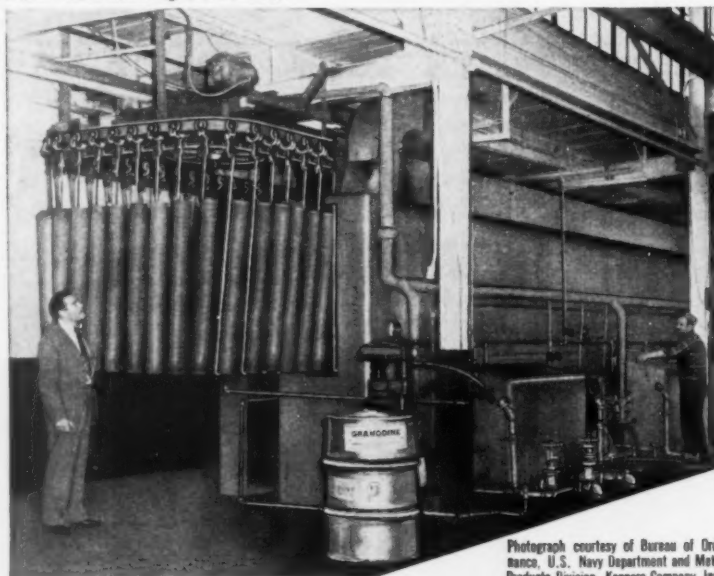
\* "GRANODINE" Trade Mark Reg. U.S. Pat. Off.

Choice of process is usually decided by such factors as the size, nature, and volume of production.

#### **"GRANODINE" STANDARD PRACTICE ON BOTH CIVILIAN AND MILITARY PRODUCTS**

Automobile bodies and sheet metal parts, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, tanks, trucks, jeeps, containers for small arms, cartridge tanks, 5-gallon gasoline containers, vehicular sheet metal, steel drums and, in general, products constructed of cold-rolled steel in large and continuous production are typical of the many products whose paint finish is protected by "Granodine".

In military production, "Granodine" is used to obtain a zinc phosphate finish meeting Grade I of JAN-C-490 and equivalent requirements of other specifications.



Photograph courtesy of Bureau of Ordnance, U.S. Navy Department and Metal Products Division, Koopers Company, Inc.

Typical power spray washing machine for the automatic application of a protective phosphate coating to metal parts in preparation for painting. These 5" rocket motor tubes, as well as products made of cold rolled sheet steel, are effectively phosphate coated in such equipment.

CHEMICALS  
ACP  
PROCESSES

## Production

### **BUSINESS: Return**

**Recession talk fades as mid-year production indices remain high . . . What they show**

Talk of a business recession for 1953 has now faded. Question businessmen are asking is how long high production rates can continue rather than when will recession strike.

It's a clue to general optimism in industry. Many businessmen admit sales may slip in the fourth quarter. Soft spots in some areas of the economy indicated this is happening to some extent now. Barring unexpected and unlikely drastic slashes in defense spending the anticipated downtrend will be gradual and is being construed by many industrialists as a return to a normal market—not recession. Here are some of the production facts influencing their thinking:

Although most steelmakers still have 4 or 5 months of order backlogs, the ingot rate will be held below 100 pct of capacity because of vacations, hot weather, and maintenance problems. Consumers' steel inventories are growing. Overall purchasing policy of firms, as reported by National Assn. of Purchasing Agents, is conservative.

#### **Business Failures Mount**

Highlighting thriving state of business, construction contracts awarded in the 37 states east of the Rockies were 8 pct over 1952's corresponding 5 months, reports F. W. Dodge Corp. The 5-month '53 total was \$6,792,329,000.

Business failures for 1953—up to week ending June 18—totaled 4193 or an average of 168 per week, says Dun & Bradstreet. This tops 3941 or an average of 158 last year. Wholesalers, construction had a higher mortality while mining, manufacturing declined.

Railroad freight carloadings in the third quarter will surpass same period last year by 8 pct, predict 13 regional Shippers Advisory Boards. Loadings of freight revenue for week ended June 20



## to Normalcy?

were 812,578 cars, reports Assn. of American Railroads. It's 26.2 pct over figures for the same quarter in '52.

Machine tool production rate and order backlog has been on a see-saw for the past couple of years. In Jan. 1951, demonstrated production rate listed by National Machine Tool Builders Assn. was 129.6 and the ratio of unfilled orders to production was 15.2 months. Preliminary figures for May '53 were 415.6 for output and 7.6 months on unfilled orders. Meanwhile May's preliminary shipment rate dropped to 359.0 from 372.7 in April.

### More Metal Products

Manufacture of metal products in most cases was on the upswing in the first quarter, reports Bureau of Census, Dept. of Commerce. Construction machinery production in first quarter '53 topped fourth quarter '52 by 6 pct. Shipments of excavating and earthmoving equipment, except tractors, were worth \$120 million.

Shipments of plumbing fixtures in first quarter outstripped the same period last year by 15 pct.

April shipments of metal cans at 302,000 tons rose 8 pct over March and 5 pct over April '52. Nonfood cans in April totaled 129,000 tons—10 pct over March, 14 pct over April last year.

Automakers continue as a potent force in keeping national production indices high. For the week ending June 27 auto output was 152,917 against 92,379 last year, according to *Ward's Reports*. However, this year's truck production has been suffering.

Gears slipped in May. American Gear Manufacturers Assn. index shows that volume for the gearing industry fell 12.6 pct from April.

Video and radio output for first 5 months was at an all-time record, claims Radio-Television Manufacturers Assn. The industry made 3,309,757 TV sets and 6,102,711 radios against 1,957,083 TV sets and 4,469,432 made in the same 5 months 1952.

## Yours for REDUCED FIRE LOSSES

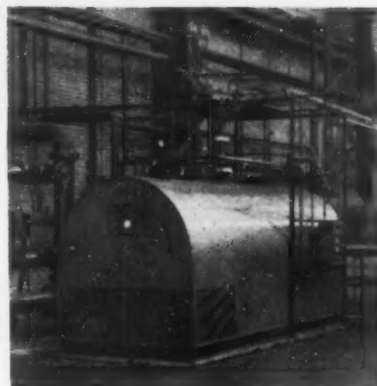
# CARDOX Experience

The Priceless "EXTRA"

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**Low Pressure Carbon Dioxide  
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Thousands of Systems  
since, for most of the  
nation's leading corpora-  
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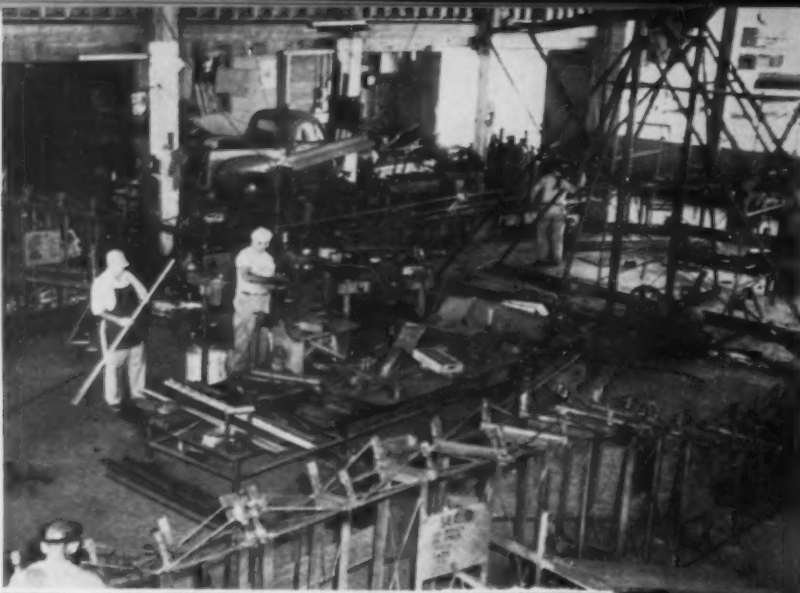
July 9, 1953

## Recreation

### How to Build Roller Coaster

Roller coasters may sound a far cry from metalworking, but they form the basis for one of the most unusual industries in the country. B. A. Schiff & Associates is one of four firms that work around the calendar making roller coasters, merry-go-rounds and other rides for the more than 600 amusement parks in the U. S.

Schiff can turn out a roller coaster every 8 days at its Miami, Fla., plant by using modern manufacturing methods, against the 6 weeks previously required. Mr. Schiff reports that while no basic new park device has appeared in years, factory techniques and safety factors have been greatly improved.



SKILLED CRAFTSMEN work in metal, wood and plastics to make rides rugged enough to stand up to a season's work-out by the Space Cadet set.

FREE INSPECTION is provided by neighborhood youngsters whenever B. A. Schiff & Associates completes a new roller coaster at its Miami plant.



PLASTIC PONIES are the new look on merry-go-rounds, retain their attractive appearance despite the most strenuous of would-be Hopalongs. But basic designs of rides stay the same for years.

AIR FREIGHT is used to ship the finished rides to amusement parks. Proper timing of shipments, which weigh several tons, is a ticklish business. Early delivery means costly storage; too late, lost trade.



# ECONOMY: Funds Cut, Spending Holds

Services will spend \$9 billion over new funds provided . . .

Deficit will be charged to unspent funds carried over . . .

Funds listed for major items—By A. K. Rannells.

First step in forcing economy on the military services was taken last week when the House Appropriations Committee reported out the defense appropriations bill (H.R. 5969) after trimming more than \$7 billion from the budget submitted in January by former President Truman.

This cut can be made, the committee stubbornly contends, without hurting national defense—or even slowing down the current rate of spending.

## Spending Won't Drop

In its report justifying the reduction, the committee said it realizes that the combined services will actually have to pay out about \$43 billion during the next 12 months—a shade above actual expenditures during fiscal year 1953.

This confirms an earlier report by THE IRON AGE (May 14, page 83) that regardless of budget slashes in the upcoming military budget, actual spending levels would not drop over the foreseeable future.

Stripped of legal phrasing, H. R. 5969 provides (round figures) \$13 billion for Army, \$11 billion for Air Force, \$9.4 billion for Navy and Marine Corps, and \$1 billion for the Defense Dept. itself—making a total of \$34.4 billion in new money.

This is nearly \$9 billion less than the services are expected to pay out. How can it be done?

Easy, says the committee. First, freeze buying of equipment and materials where there are excessive stocks until inventories reach practical levels. Next, eliminate duplication of effort and broaden single procurement practices.

Then, utilize personnel more widely, reprogram certain requirements, and finally, charge remainder of the deficit against the carry-over.

Carry-over of unexpended balances as of June 30 was estimated at \$57.6 billion. With the proposed \$34.4 billion in new money, there would still be more than \$92 billion available.

Moreover the Joint Chiefs of Staff are directed to completely review the whole picture, report back to the White House within the next 3 months whether the services are being short-changed.

As far as that is concerned, the committee adds, there's absolutely nothing to keep the services from spending the whole \$92 billion in 30 days or less, if that's possible.

Actually, most of the wrangling has come from the Air Force, which is getting \$11 billion in new spending authority instead of the \$16 billion asked in the original budget.

Both Army and Navy, cut a combined \$1.3 billion, agree that they can continue Korean operations, maintain a defense build-up, and still get along.

Air Force contends that since about two-thirds of its \$5 billion cut is in aircraft procurement funds, attainment of the 143-wing goal will be seriously slowed down.

But Defense Secretary Wilson argues that with aircraft produc-

tion moving into high gear it isn't necessary to place orders so far in advance.

By adding \$3.5 billion in new money to the carry-over it is estimated enough money will still be available to order more planes than can be delivered. Deliveries are now about 650 a month and can't be stepped up past 730 a month before next March in any event—when Congress will again be in session.

## Where Funds Will Go

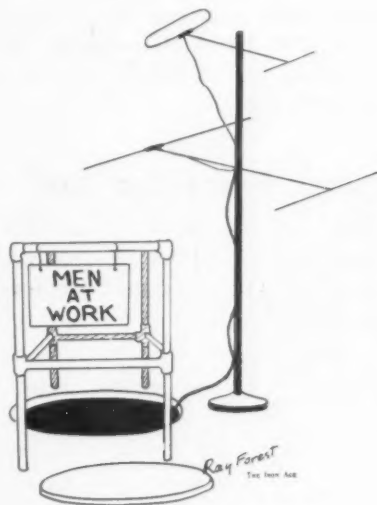
Touching on a few major categories, the first draft provides new funds as follows:

**Aircraft:** Air Force is given \$3.5 billion to add to carry-over, assuring orders for more than 2100 new aircraft. Nearly \$1.4 billion is suggested for Navy to buy aircraft for replacement of crashes and combat losses and for modernization of operating forces. Army procurement, which is to be liaison type, will be lumped under military hardware. Marine Corps will maintain 3 combat wings.

**Army Military Hardware:** Unspent funds amount to more than \$12 billion. It is proposed to appropriate another \$3.2 billion for additional procurement of weapons, ammunition, tanks and other combat vehicles, aircraft, guided missiles, materials handling equipment, etc.

**Shipbuilding:** Recommendation is for \$741 million, about \$121 million more than was spent in 1953, which includes \$539 million for new construction. This would provide for starting 19 new ships, including a third large carrier of the Forrestal class, and more than 150 smaller craft. Idea is not to expand but to maintain present fleet level.

**Research and Development:** Approximately \$844 million is proposed—\$440 million for Air Force, \$345 million for Army, and \$59 million for Navy. This is a sizable slash. But the carry-over has increased each year until it totaled \$1.6 billion as of June 30. Added to the new money, this is considered adequate to carry on at present levels—about 6000 proj-





ects employing 114,000 personnel including 39,000 military personnel.

**Reserve Tools:** It is proposed to authorize \$500 million as recommended in the Vance Plan to start building an industrial equipment reserve. This is to be spent, however, only after "very careful study" and less than one-half is expected to be obligated over the coming 12 months.

## Ideas:

### Army finds employee suggestion plan is paying dividends.

Under its employee-suggestion plan, the Army has been paying for ideas over the last 10 years. There's no accurate way of determining exactly how much money has been saved by these suggestions, but the Army is certain the sum is considerable.

Payment by government departments in plans such as this is authorized for employee suggestions resulting "in improvement or economy in operation or administration."

An approved idea might suggest a new way to prevent accidents or to streamline procedure.

#### Had Jump On Industry

Since the Army program started in 1943, \$1.74 million has been paid to 70,000 employees for suggestions that save time, money and increase morale. Estimate of savings



HAROLD C. LUDWIG, left, radio production worker at Lima, Ohio, Ordnance Depot, shows his boss, Irvin Howe, the continuity tester for Army tank circuits which won him a \$275 award.

during the first year is around \$125 million.

Employee-suggestion was started in the Army about 1912—before industry adopted the idea about 30 years ago. Army's program at that time was limited to Ordnance but



S. D. GRUMNEY, chemist at Radford, Va., Arsenal, shows how he repairs valuable laboratory glassware at the arsenal. Savings to the Army from his volunteer work have won him a \$250 award.

was broadened in 1943 to include the entire War Dept.

#### Saves \$5 Million

Highest amount paid out by the Army for an employee idea was \$2750. This went to an Ordnance worker who suggested interior packaging material be salvaged and used over and over in interplant shipping.

Ordnance figured this idea saved \$5 million the first year.

Officials have no reliable standards for comparing Army results with similar programs in industry. But on the basis of available information, they think it compares reasonably well.

## Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Casing, burster, 38000, \$206,099, Prentiss Wabers Co., Wisconsin Rapids, Wis.  
Case, cartridge, brass, 20 MM, 2914400, \$573,641, Nesco, Inc., Milwaukee.  
Primer, percussion, M54, 17000000, \$334,190, Stewart Warner Corp., Chicago.  
Shell, HE, 105 MM, 223475, \$1,769,922, Thor Corp., Bloomington, Ill.  
20 MM feed mechanisms, 11440, \$1,182,371, Sunbeam Corp., Chicago.

Shell, HE, 155 MM, 70000, \$1,592,000, Pressed Steel Car Co., Rockford, Ill.  
Cartridge, storage, case, 2000000, \$5,570,000, Conco & Engineering Works, Mendota, Ill.

Shell, HE, M71, 90 MM, 220000, \$1,218,910, General Motors Corp., Anderson, Ind., R. W. Heaton.

Percussion element for primer, 26300000, \$97,809, Aluminum Co. of America, Richmond, Ind.

Fitting, upper, 22 ea, \$54,555, General Dynamics Corp., Groton, Conn.  
Pumps, fuel oil, 12 ea, \$156,004, Turbine Equipment Co., New York.

Fuze, grenade, hand, 941000 ea, \$356,177, Bayshore Industries, Inc., Elkton, Md.  
Mine, apers, 1700 units, \$103,300, Precision Plastics Co., Philadelphia.

Grenade, hand, 1605000 ea, \$312,975, Richmond Foundry & Mfg. Co., Richmond, Va.

Four, 67, 368 KVA alternating-current generators, job, \$4,244,226, Westinghouse Electric Corp., Seattle.

Ten 103,300 KVA transformers and appurtenances, job, \$1,761,317, English Electric Export & Trading Co., New York.

Breakers and generator grounding equipt, job, \$461,246, Allis-Chalmers Mfg. Co., Milwaukee, F. E. Worley.

Terminal lug, 5761164, \$85,780, Aircraft Marine Products, Inc., Harrisburg, Pa.

Test unit, 1176, \$353,641, Sprague Engineering & Sales Corp., Gardena, Calif.

Fuel pump test stand, 25, \$149,547, Greer Hydraulics, Inc., Brooklyn, Paul A. Williams.

Shell, HE, 105000, \$918,750, Motor Wheel Corp., Lansing, Mich.

Shell, HE, 105 MM howitzer, 149535, \$1,049,735, Kelsey-Hayes Wheel Co., Detroit.

Automotive spare parts, 185250, \$640,318, General Motors Corp., East Pontiac, Mich.

Automotive spare parts, 11000, \$1,992,590, Reo Motors, Inc., Lansing, Mich.

Automotive spare parts, 12500, \$1,246,540, General Motors Corp., East Pontiac, Mich.

Truck spare parts, 235400, \$113,610, Continental Motors Corp., Muskegon, Mich.

Housing, relay igniting charges, 500000, \$123,750, Detroit Brass & Malleable Co., Detroit.

Automotive spare parts, 20000, \$73,200, Holley Carburetor Co., Detroit, N. Dana.

Transmission assys, 430, \$3,440,000, General Motors Corp., Flint, Mich., W. J. Brewer.

Rod, cleaning, cal. .30, 2000000 ea, \$79,000, Ever-tite Mfg. Co., Davenport, Ia.

Saw, band, metal cutting, 120 ea, \$336,352, Boice-Crane Co., Toledo.

Axle, assy, 880 ea, \$384,480, F. L. Jacobs Co., Detroit.

Spare parts for refrigeration unit, 1137, \$77,803, U. S. Thermo Control Co., Minneapolis.

Detonator, M24 for fuze, 211300 ea, \$60,347, Valco Mfg. Co., Franklin, N. J.

Wire, firing, 2750000 ea, \$30,112, Victor Electric Wire & Cable Corp., Clifton, N. J.

Drills, 632990 ea, \$91,497, New York Twist Drill Co., New York.

Maintenance parts for R975-40-52 engine, var, \$222,836, Continental Aviation & Engineering Co., Detroit.

Brake assy, 293 ea, \$64,460, The Goodyear Tire & Rubber Co., Inc., Akron.

Wheel and brake assy, 456 ea, \$214,075, The Goodyear Tire & Rubber Co., Inc., Akron.

Valves for ventilation heaters, 2000 ea, \$103,183, Sarco Co., Inc., New York.

Catapult items, 11805, \$574,050, Arnolt Corp., Warsaw, Ind.

Catapult items, 2000, \$247,000, Consolidated Engineering Co., Haverford, Pa.

Catapult items, 7490, \$206,385, Century Engineering Corp., Cedar Rapids, Ia.

Catapult items, 809, \$118,121, American Metal Products, Bridgeport, Conn.

Spare parts for director M7A1B1, 76, \$273,371, Dellenberger Machine Co., New York.

Primer, 12454000, \$60,134, Remington Arms Co., Bridgeport, Conn.

Elapsed time clocks, \$201,623, Elgin National Watch Co., Elgin, Ill., W. E. Miller.

Primers, 6120000, \$95,288, Remington Arms Co., Bridgeport, Conn.

Arming mechanism, pilot lot, 2600, \$168,480, Underwood Corp., New York.

Spare parts for FCS, AA, 1500, \$132,000, Sylvania Electric, Inc., Woburn, Mass.

Cal. .60 bullet jacket, 151600, \$70,524, Bridgeport Rolling Mills Co., Bridgeport, Conn.

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## is our role!

Control! You need it to land the tricky trout . . . and you need it also to properly produce iron and steel. Keokuk Electro-Silvery *helps* you by controlling the precise percentages of silicon . . . or the exact combination of manganese, chrome or nickel to suit your melt specifications. And Keokuk controls not only quality but costs too! So write today for more information about the role played by Keokuk Electro-Silvery in charging the cupola or blocking the open hearth. You'll find it interesting . . . and profitable.

## KEOKUK

ELECTRO METALS COMPANY

Keokuk, Iowa

Wenatchee Division: Wenatchee, Washington



*In fishing, proper control keeps the big ones from getting away. Here, Chief Keokuk reels in tonight's fish fry while Junior stands by with a gaff and Princess Wenatchee nets a long, low whistle.*



Keokuk Electro-Silvery . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

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- Round
- ⊞ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

## Armature Banding Wire

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

## Lock Safety Wire

Tough, durable, workable. In the size and type for your work.

## Spring Wire

Any shape\* . . . high carbon . . . hard drawn . . . high tensile . . . stainless . . . galvanized . . . tinned . . . bright.

\* Cross-sectional areas up to .250" square; widths to 3/8"; width-to-thickness ratio not exceeding 6 to 1.

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### WE'LL do this—

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Write Today

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WIRE**

**ACCO**



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AMERICAN CHAIN & CABLE

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Los Angeles, New York, Philadelphia,  
Portland, San Francisco, Bridgeport, Conn.

## Industrial Briefs

**Southern Sales . . . LUKENS STEEL CO.**, Coatesville, Pa., has opened a new sales office in Richmond, Va., with George Copeland as manager.

**Retiring . . . AMERICAN RAILWAY CAR INSTITUTE**, reports the retirement of Charles W. Wright as president. Gustav Metzner, chairman of the board, will assume the additional duties of president.

**New Company . . . STEEL SALES CO.**, 210 Hazel Drive, Pittsburgh, is a new company formed by Raymond H. Meister, iron and steel scrap broker, that will be suppliers of reusable rails and non-ferrous materials.

**Elbow Room . . . JONES & LAUGHLIN STEEL CORP.** will enlarge the capacity of its Electricweld Tube Div. plant at Oil City, Pa.

**Titanium Lab . . . MALLORY-SHARON TITANIUM CORP.** formally opened an industrial laboratory to be devoted exclusively to research and development on titanium at Niles, Ohio, recently.

**Purchases Line . . . ALTEN FOUNDRY & MACHINE WORKS**, has purchased the Ideco pumping unit line from the Dresser Industries.

**New Location . . . THE TRANE CO.** has moved its Chattanooga, Tenn. sales office to 308 S. Kelley St.

**Delivered . . . AIRESEARCH AVIATION SERVICE CO.**, Los Angeles, has delivered a second Martin B-26 it converted for executive use for Tennessee Gas Transmission Co., Houston.

**Contest Winners . . . CLARK EQUIPMENT CO.** awarded two members of the materials handling class at the Illinois Institute of Technology, Chicago, cash prizes for winning entries in a Materials Handling Essay Contest sponsored by the company. Kenneth J. Hlavin, won first prize of \$250 and R. N. Roegner, won second prize of \$100.

**Installed . . . COLORADO FUEL & IRON CORP.** has installed new annealing equipment at its fully-integrated steel mill at Pueblo, Colo.

**Elected . . . AMERICAN INSTITUTE OF MANAGEMENT**, has elected William F. Chase, president, Bearings Service Co., a charter member of the president's council.

**Opened . . . LINK BELT CO.**, Chicago, marked the official opening of Link-Belt Ltd.'s 72,000 sq ft engineering plant at Scarboro, Ont., with the visit of more than 500 civic leaders, engineers and industrialists recently.

**Rod Mill . . . American Steel & Wire Div.**, Cleveland, U. S. STEEL CORP., will construct a new rod mill on properties of the present Cuyahoga Works to increase rod production as well as replace older equipment.

**Developed . . . WESTINGHOUSE ELECTRIC CORP.**, East Springfield, Mass., has developed a small but powerful motor that packs 25 hp into its 10 pounds and helps guide torpedoes on course.

**Appointed . . . THE CLEAVER-BROOKS CO.**, Milwaukee, has appointed Hathaway - McCartney Engineering & Supply Co., Denver, as exclusive sales agent, for its self-contained boiler equipment.



Made to suit YOUR fabricating needs

## TUBING

WELDED and COLD DRAWN  
**STAINLESS STEEL**

• and other heat and corrosion resistant alloys—made with Quality Control through every step of manufacture.

CUSTOMERS SAY: "Best fabricating and machining qualities we ever had."

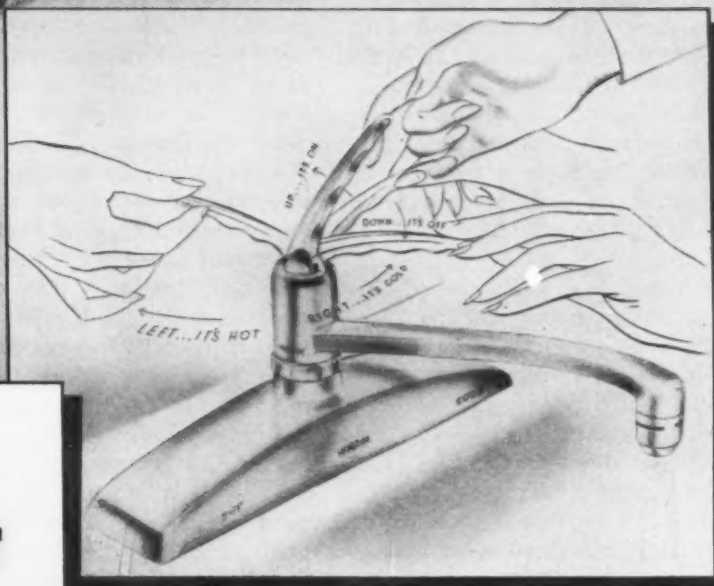
**HELICAL TUBE CORPORATION**

19 Washington Street, East Orange, N. J.  
MILL: 1825 Monroe Ave., N.W. Grand Rapids 5, Mich.





Moen Single-Handle Faucet, made by Moen Valve Co., Division of Ravenna Metal Products Co., Seattle 5, Washington.



Sketch showing operation of Moen Faucet, which can be operated by one hand, giving water at the desired temperature at any rate of flow. You can change volume without changing temperature, or change temperature without changing volume, or select the desired temperature before turning on the water. Available in various styles and types.

## Faucet maker finds **unit cost** more important than cost per pound

This Moen Faucet is unusual. First, its design represents a new idea in faucets so far as we know. If we are wrong, we will welcome the correction. But in any event, this modern faucet is selling like mad; people really want its convenience, its simple operation, its one-hand control. The second unusual thing about the faucet is that the spout is made of Admiralty Metal, supplied by Revere. This metal was chosen by Moen after consultation with the Revere Technical Advisory Service, which pointed out the qualities of Admiralty from the standpoints of bendability, and plating characteristics. Everything considered, the "more expensive" Admiralty turned out to be less expensive in the end, and more satisfactory both to the Moen Valve Co. and to its customers. The faucet also uses Revere Free-Cutting Brass Rod for interior machined parts, this again being chosen for workability and corrosion resistance. Service to Moen and to many other indus-

tries in the Mountain State area is of course provided by the Revere sales, technical and mill personnel on the Pacific Coast. Similar services are of course available from Revere everywhere in this great country. To obtain the Revere services, see the nearest sales office.

# REVERE

**COPPER AND BRASS INCORPORATED**

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230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

# The Automotive Assembly Line

## Corvette Comes Off Line On Time

**Chevrolet meets June production goal for plastic sportster . . . Plan 1000 per month in '54 . . . See great design value, but much study needed . . . Finishing costly—By R. D. Raddant.**

Chevrolet's first plastic Corvette to be turned out on a production basis came off the assembly line last week, just making the division's goal of June production.

Schedule for the remainder of the year is 50 cars a month, but Chevrolet forecasts a respectable production of 1000 a month in 1954. Its price: \$3250.

**No Gamble . . .** In spite of the revolutionary nature of the two-seater plastic sports car, its production could hardly be called a gamble. Market for whatever production could be reached was assured, and it was recognized that lessons learned from the venture would be invaluable in the future.

T. H. Keating, Chevrolet general manager, admits as much:

"The engineers want to keep on testing these first cars for a few thousand more miles, but it may

be most important to Chevrolet's future plans to learn the amazing flexibility that is demonstrated here in working out new design ideas in plastics."

**Set Up Line . . .** Meanwhile, an assembly line for continuing production has been set up in a separate building at the Flint Chevrolet assembly plant. It is a miniature assembly line, only six chassis' long, but big enough for the initial production rate which Chevrolet has established in probing this new field.

Here are some Corvette details. Powerglide transmission is standard, and the car will be powered by a stepped-up "Blue Flame" 6-cylinder engine. A two-seater, it stands 33 in. high, 60 in. wide, with an overall length of 167 in. on a 102 in. wheelbase. Weight is 2900 lb.



"A JEWEL FOR THE RICH" is the way Empresa Nacional de Autocamiones, S. A. describes its Pegaso sports car. Almost "hand-made," two-at-a-time, at the company's plant in Barcelona, Spain, the Pegaso is designed for the export market and sells for around \$17,200 in the U. S., import duties included. Production during 1953 is scheduled at 50 cars. Customers are permitted to specify colors and special gadgets. Company reports the most popular color is dark pink near the bottom, changing to light pink, yellow and white near the top.

The Corvette is assembled in the Flint plant with plastic panels furnished by an outside supplier.

**It's Not Perfect . . .** Mr. Keating's statement that the value of plastics in the auto industry may be in design carries with it the implication that a lot remains to be done if plastic is to come into its own as a body material.

Strength and toughness of laminated fiber glass is not questioned, but there is some doubt that necessary rigidity can be obtained for a full-sized body. If this is done by increasing the thickness of the plastic panel, weight will be increased, thereby sacrificing one of its most important advantages.

A second drawback is body finish. First General Motors plastic cars required excessive work—probably more than for metal—to obtain the smooth finish demanded.

**Must Beat Metal . . .** Metal finishing is already one of the most costly operations in auto manufacture. Plastics will have to prove better than metal in this department if they are to take a permanent place in the industry. But improvements are being made, and progress in die finishing alone may ease this problem.

In spite of some production problems and the usual skepticism that accompanies anything new, the Corvette is still one of the top automotive developments of the year. It is a pioneering step in two directions, body material and styling, and was brought into production on schedule in less than a year from the designer's dream stage.

**Lost Forever . . .** It is practically an axiom in the auto industry these days that a day lost in tooling is a day lost forever.

This means that overloaded tool and diemakers are working so close to capacity that lost time can scarcely be made up. There are no extra men available, no time for more shifts or overtime.

and no additional facilities to be pressed into service.

That is why a current strike among automotive tool and die-makers is causing concern to major auto companies even though they aren't expecting delivery of orders for some months.

**Strike Slows Changes . . .** Tool and diemakers in member plants of the Automotive Tool & Die Assn. in Detroit have been out since June 11. A settlement is expected momentarily, but some auto plants have already taken measures to delay 1954 model introductions and to budget their time and remaining 1953 schedules accordingly.

Chrysler set a perfect example last week by laying off 2000 workers and reducing daily output to stretch out scheduled 1953 models. This is in spite of the fact that 1954 models are still months away. The other alternative was to maintain full production through the schedule, then shut down until new models are ready to go.

**Others Hurt Too . . .** This particular manufacturer was the only one to admit the fact, but it is certain that others are evaluating their 1953 production on the same basis. Some have been aiming at early introduction on 1954s and they will be particularly affected.

Elsewhere on the labor front the Borg-Warner strike ended, permitting resumption of production at curtailed independents. Kaiser, Nash and Willys were all down completely and Studebaker was hard pressed by the lack of transmissions.

## Independents Fight for Sales

The independents are having it tough this year. They seem to have caught it on the chin from every angle.

As a result, the Big Three is increasing its already dominant percentage of the market, not so much at the expense of each other, but at the expense of the smaller producers.

General Motors will capture

Automotive Production (U. S. and Canada Combined)		
WEEK ENDING	CARS	TRUCKS
July 4, 1953 . . .	127,777*	17,670*
June 27, 1953 . . .	152,917	17,670
July 5, 1952 . . .	68,375	15,677
June 28, 1952 . . .	92,379	23,889
*Estimated Source: Ward's Reports		

about 47.3 pct of first half output, just slightly less than the 48 pct President Harlow H. Curtice set as GM's goal. This is back to pre-war levels from which GM had slumped in postwar years.

Chrysler is taking in 21.5 pct of the market and Ford 20.2, according to statistics of Ward's Automotive Reports. This leaves only about 11 pct left for the independents, a figure which may go lower.

Early in the year the smaller companies were unable to match their bigger competitors in the scramble for steel. Some change-over troubles also slowed production when sales were hottest.

Recently the highly-publicized Borg-Warner strike brought the

independents to their knees again. Now the last half sales struggle is in progress. In the "dog eat dog" atmosphere that is developing it will be even tougher for the smaller companies to regain their lost percentages.

Two second half races to watch will be between Chrysler and Ford for second place in the industry and between Nash and Studebaker for leadership among the independents.

## GM Will Try Teaching Teachers

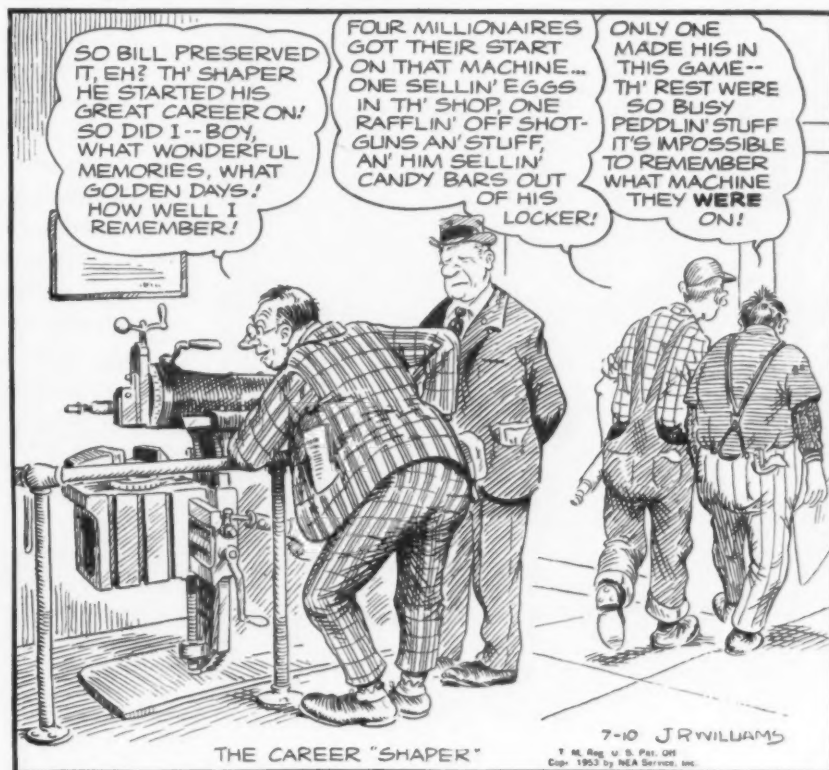
General Motors is going to have a try at educating educators.

Beginning in September, GM will publish an engineering journal which will be distributed to engineering schools and science departments in secondary schools. It will present GM technical developments to educators and students in bi-monthly issues.

While its purpose is principally to be informative on GM developments, it has a dual purpose in influencing engineering departments in schools.

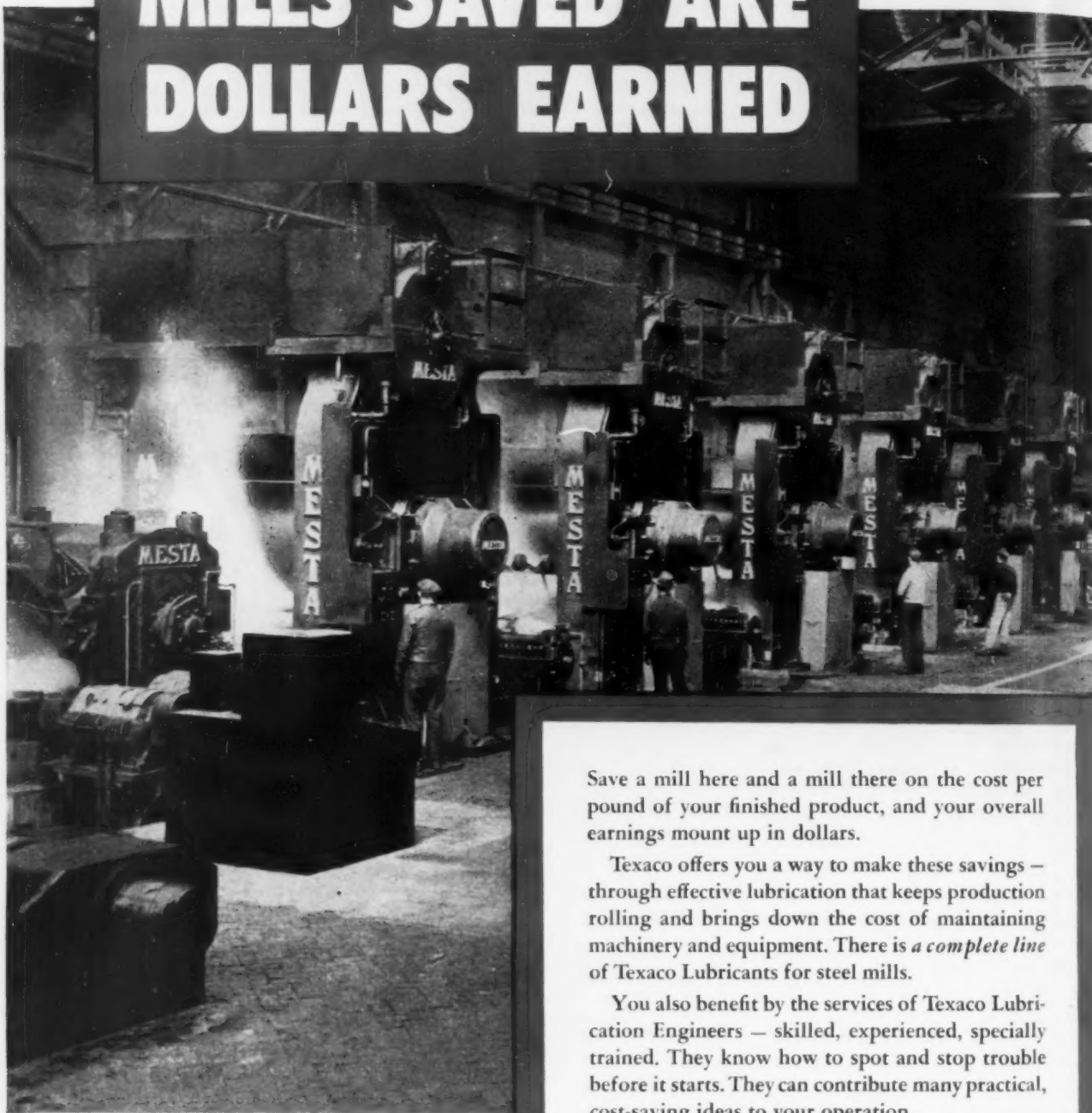
## THE BULL OF THE WOODS

By J. R. Williams





# MILLS SAVED ARE DOLLARS EARNED



Save a mill here and a mill there on the cost per pound of your finished product, and your overall earnings mount up in dollars.

Texaco offers you a way to make these savings — through effective lubrication that keeps production rolling and brings down the cost of maintaining machinery and equipment. There is a *complete line* of Texaco Lubricants for steel mills.

You also benefit by the services of Texaco Lubrication Engineers — skilled, experienced, specially trained. They know how to spot and stop trouble before it starts. They can contribute many practical, cost-saving ideas to your operation.

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## **TEXACO** Lubricants, Fuels and Lubrication Engineering Service

### Humphrey Favors Cuts in Depreciation

**Treasury head sympathetic to industry proposals to lower 20-year writeoffs to 10 years . . . Government would have to lose tax money now to gain later—By G. H. Baker.**

Already on record as favoring a careful study of today's unrealistic depreciation rates on machinery and other capital goods, Treasury Secretary George M. Humphrey is listening sympathetically to industry proposals that 20-year writeoffs be dropped to 10 years or less.

When listening will be translated into action is subject to a wide range of speculation. Mr. Humphrey, who urged continuation of the excess profits tax, is trying to fulfill political obligations to balance the budget next year.

**Lose Now, Gain Later . . .** Washington sources say the immediate result of lower depreciation would probably be a substantial loss of federal revenue. This is regarded as a dampener for quick depreciation action by the Secretary.

However, Mr. Humphrey will have the responsibility of balancing other future budgets and from the long-term viewpoint a reduction of depreciation time could stimulate a higher tax take after the initial decline.

**Incentive to Grow . . .** Another inducement to act as quickly as possible is the prospect of gradually slumping sales of machinery. Both the Treasury and industry officials agree more realistic amortization rates would in the long run yield more government revenue. Corporate income and taxes on it would grow by giving industry more incentive to expand and modernize plants and equipment.

Mr. Humphrey already has authority to revise existing amortization regulations to some extent

—even in the absence of new legislation. Tax lawyers can't agree just how far he could go. A basic revision would have to be sanctioned by Congress and there is serious doubt if the present session would hastily enact any bill of such scope.

**Cuts Months Away . . .** Excise tax reduction, despite occasional glimmers of hope from individual congressmen, still is many months away. The currently high rates, which are still at the war-time level of 10 pct in the cases of many household appliances, are held responsible by many retailing and wholesaling organizations for sluggish sales activity.

Truth is that Congress finds itself unable to reduce the 1954 fiscal budget to the point where excise reduction is probable.

This does not mean Congress is unaware of the heavy burden present federal excises impose on sales. House Speaker Martin believes their reduction would be of great value to business and to individual incomes. But he thinks



"It's a dry heat though, and you don't mind it so much."

Congress should take a close look at excises now and determine what cuts should be made next year.

**Blames "Financial Mess" . . .** Rep. Martin admits excise reduction this year had been the goal of the Eisenhower Administration and Congress. But, he adds, "The financial mess we inherited was greater than we had anticipated." In closing fiscal year 1953, a \$9.4 billion deficit was found.

Congressional leaders aren't ready to say so yet, but they are shooting for a thorough survey of the whole federal tax structure this fall that should pave the way for substantial cuts in both excise and income levies to be voted next year.

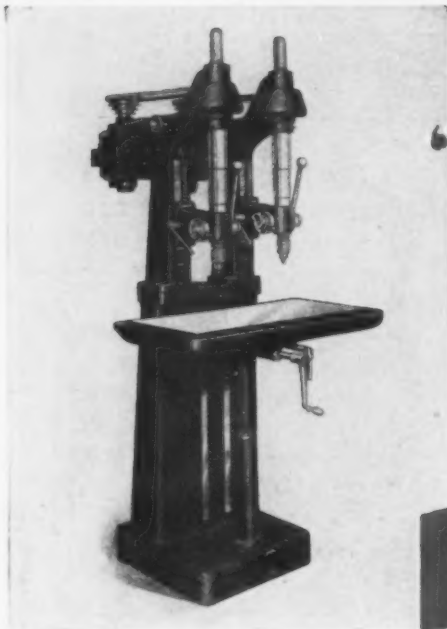
**Short on Structural . . .** Existing and projected capacity for producing wide flange structural steel shapes is still some 650,000 tons short of requirements as seen by the Office of Defense Mobilization.

It stands ready to approve applications for certificates of necessity and tax amortization covering that amount of new production, the agency said last week.

A survey of production and requirements has resulted in ODM setting a capacity goal of 2,850,000 tons to be reached by the end of 1954. Production in 1950 was about 2 million tons.

This would mean an expansion of 850,000 tons. Certificates have been approved or are pending to cover about 200,000 tons.

**Unrestricted by Shortages . . .** Construction of new stores and small industrial buildings is moving ahead at a healthy clip, the U. S. Dept. of Commerce reports. Many retail and jobber organizations are making up for postponements in construction and modernization forced upon them last year by shortages.



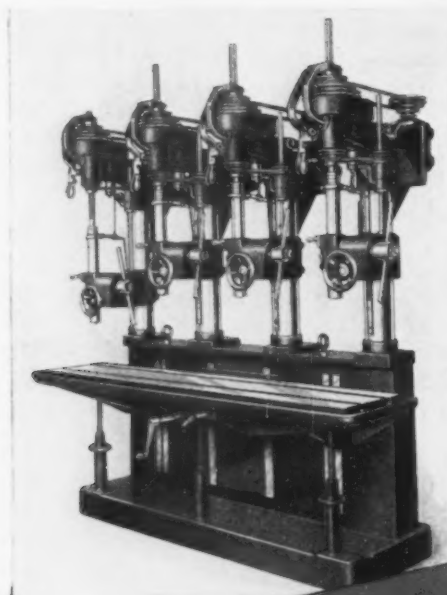
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**BUILDS the DRILL**  
that can cut your  
• **REJECTS**

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• **FATIGUE**

... IN THE TOOL ROOM  
... OR "ON THE LINE"

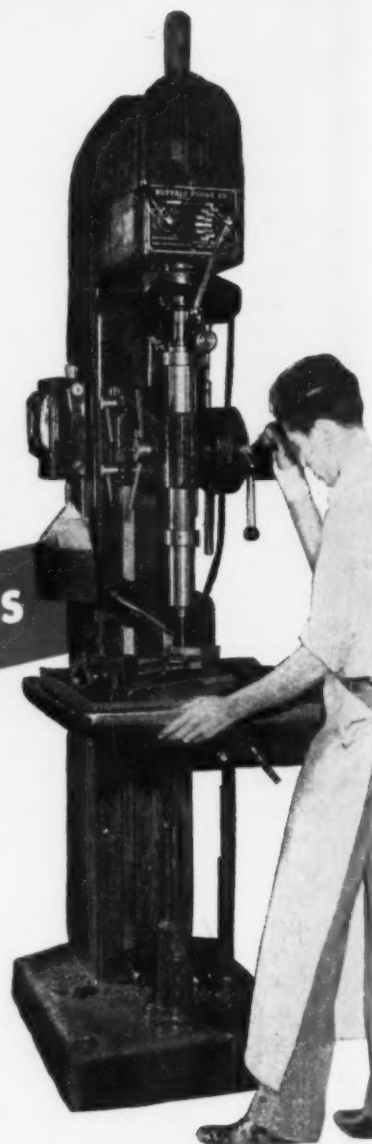


You can pick a "Buffalo" Drill matched to the exact drilling, tapping or reaming jobs you do, and get a real saving in time and costs. At left is one example—the "Buffalo" No. 14 High Speed Sensitive Drill for accurate work on precision parts using drills up to 1/2".

Seven other models, up to 2" capacity in cast iron, are available. All controls are placed for almost effortless operation. Speed changes and table or head raising or lowering are all done rapidly.

For JOB DRILLING or "MARATHON" RUNS

Whether you need a machine for odd-job drilling, tool room work or long production runs, "Buffalo" builds it. At right is the famous "RPMster", the drill with 1001 speeds instantly changed. At left is the big, rugged "22" that's as easy to handle as small sensitive drills. As a first step towards getting your drilling costs down, why not write us for recommendations on your problem? Thousands of plants have benefited by doing this.



*"Buffalo"* MACHINE TOOLS  
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## CONTROLS: Extend Allocation Power

**Congress approves extension of federal allocation authority over steel, copper, other scarce materials for 2 years . . . Plan materials allocations for defense only.**

Federal allocation authority over steel, copper, aluminum and at least six other scarce commodities is now slated to extend through June 30, 1955—the longest period of control authority voted by Congress since World War II.

The allocation machinery was converted on July 1 from the Controlled Materials Plan to the Defense Materials System (DMS). Under DMS, the Commerce Dept. plans to earmark scarce materials for defense and atomic energy contracts and subcontracts only.

There are no plans to allocate materials to manufacturers of civilian goods, nor is there any provision in the new Defense Production Act for control of prices, wages or credit. Only nickel remains completely controlled.

Also absent from the new law is authority sought by the White House to establish a new Small Business Administration. If a new SBA were approved it would take over functions of the Small Defense Plants Administration and would be able to make loans to small firms.

SDPA, meanwhile, has been extended until July 31, in order to give Congress more time to decide what to do about the SBA proposal.

In addition to the new authority to allocate scarce materials, the Administration also is authorized to extend for 2 more years its defense financing programs for increasing productive capacity, loan guarantees for defense plants, and procurement contracts applying to key metals and scarce materials.

### Commerce to Close Info Sources

Some Federal advice to business is due for future distribution via chambers of commerce and other non-government agencies.

U. S. Commerce Dept. is planning to close 11 of its 42 field

offices on July 31 in a money-saving move ordered by Secretary Sinclair Weeks. The information and advice now dispensed through the field offices is to be distributed after that date through what Mr. Weeks calls a "cooperative network" of 580 local chambers of commerce and similar business organizations.

Mr. Weeks says the move will result in reaching a far wider segment of business. Savings of about \$200,000 annually will accrue to taxpayers.

Offices to be closed are located in Baltimore, Butte, Salt Lake City, El Paso, Hartford, Louisville, Milwaukee, Mobile, Oklahoma City, Omaha, and Providence.

## Reorganization:

**Munitions Board, other agencies out . . . Transfer duties.**

End of the Defense Dept. Munitions Board last week does not mean the military hierarchy is playing down the importance of full-scale logistics planning.

Under a new departmental directive, the reorganization action which did away with the board was followed immediately by transfer of that agency's functions to a special assistant to the Defense Secretary. The new assistant is Willard F. Rockwell, Pittsburgh businessman.

### Will Appoint Aids

Munitions Board was only one of several agencies eliminated in the first Defense Dept. reorganization move in 4 years. Under the new setup the Research and Development Board, Office of the Director of Installations, and Defense Supply Management Agency,

## Manganese Recovery

Defense Materials Procurement Agency last week authorized construction of a pilot plant for testing a nitric acid method of treating low-grade manganese ores and manganese-bearing slag.

A contract has been negotiated with E. S. Nossen Laboratories, Inc., of Paterson, N. J., to construct a \$489,000 plant near that city for treating ores from Aroostook County, Maine.

The Nossen process has proved successful in laboratory tests. Terms of the contract call for construction of a plant designed to produce 2 tons of metallurgical manganese a day.

Project and tests are to be completed in 15 months.

If practical, the process can recover a minimum of 275 million short tons of manganese from the Aroostook region, it's estimated.

have all been wiped out. Top officials of these agencies are being retained to keep the work going.

Later there will be six new assistant defense secretaries who will take over these jobs in addition to other duties.

### Get More Power

Several changes in the relationship of the Joint Chiefs and the Defense Secretary are planned. The JCS chairman will have responsibility for managing the work of the Joint Staff and will be able to control selection of officers who will serve in that body.

Granting of added powers to the JCS chairman was the portion of the reorganization plan which drew the most congressional criticism. Its intent, however, was to make certain JCS would not be bogged down with paper work.

## ODM Okays Electric Power Boost

Office of Defense Mobilization has approved certificates of necessity for an additional 31 electric power projects, estimated to increase generating capacity by 1 million kw.



...with TYCOL lubricants on hand!

**Heavy-duty cutting operations?** Here's what happens when you switch to Tycol Afton oils! A well-known Engineering Company (you'd recognize the name instantly) recently tested cutting oils used to shape 14" gears on a Gleason Bevel Gear Generator. Their findings: after the first rough cut around, with competitive oils, they had to grind a full  $\frac{1}{8}$ " off the cutter. With Tycol Afton 8, they hobbled *two* gears and took off only .013". Afton oils are non-corrosive . . . and so stable they're widely recommended as hydraulic oils! They serve a triple function as coolants, lubricants, and hydraulic media on the same machine . . . the heavier the cut — the better they perform. It will pay you to find out why — by contacting your local Tide Water office!

Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

REFINERS AND MARKETERS OF VEEDOL . . . THE WORLD'S MOST FAMOUS MOTOR OIL



Boston • Charlotte, N. C. • Pittsburgh  
Philadelphia • Chicago • Detroit  
Tulsa • Cleveland • San Francisco  
Toronto, Canada



### Engineers Drive to Get Costs Down

**Cutting production costs was major interest at Los Angeles ASME convention . . . Electronics, less wasteful shop practice, new materials stressed by experts—By T. M. Rohan.**

Production costs and how to cut them held the engineering spotlight in Los Angeles last week. Electronics and improved shop practices came in for special attention as cost-cutters as 150 technical speakers outlined production economies at 50 technical sessions of the American Society of Mechanical Engineers semi-annual convention. Over 2000 ME's were on hand for the sessions.

**Electronic Brains . . .** R. C. Canning, University of California research engineer, said electronic brains are cheaper than human ones for certain assembly plants employing over 1000.

In an actual case study an electronic production controller took over the work of 14 out of 29 employees. Direct salary and overhead savings would hit \$175,000 in 2½ years. A 3 pct increase in the \$12 million output in this period would be \$360,000. Cost of equipment would be \$250,000 to \$300,000 compared to \$535,000 savings.

**Getting Fussy . . .** The area's major industry of planebuilding came in for heavy discussion. H. W. Benjamin of Lockheed said producibility and serviceability of new metals are now equal in importance to weightsaving and structural advantages claimed.

Designers no longer grab new materials offered by exuberant salesmen as they did before and during World War II. Salesmen must now submit authentic data to get experimental orders although airplane builders will share financing of investigation. Plastics too must now undergo thorough analysis.

**Non-Burning Paper . . .** A typical instance of shop cost saving was described by L. D. Miles, General Electric value analyst. Expensive asbestos paper was being used in the Schenectady shops to catch paint drippings in line with the fire safety code.

Investigation found a much cheaper, equally safe non-burning paper.

**Tailspin . . .** One of the more precarious aspects of military plane contracts was glaringly shown in Burbank, Calif., last week. Pacific Airmotive Corp., aircraft engine overhaul firm, received a \$3-million maintenance contract Monday from the Air Force. The following day it was cancelled in a Defense Dept. cut-back.

Pres. Thomas Wolfe was philosophic about the whole thing: "Such push-button programming leaves us with nothing but our claim to having held the shortest military overhaul contract on record."

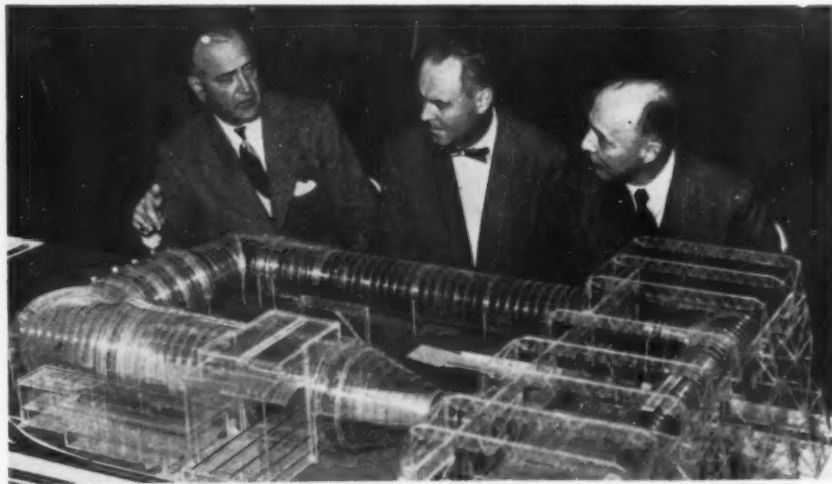
**Economy Size . . .** Western steel warehouses last week were quoting 40,000-lb quantity price discounts for the first time. Discount was started nationally in 1948, but western orders were seldom so large. The class was never quoted except occasionally in Seattle. In the 1949 recession the class was abandoned.

An independent Chicago warehouse started the ball rolling again with recent price changes. A national warehouse firm operating there also put in the 40,000-lb discount to meet competition. Warehouses in other cities took it up last week.

Quantities of 40,000 lb are now quoted about 50¢ off the base for hot-rolled products and cold-rolled sheets.

**Few Complaints . . .** Western warehouses generally have met few complaints on the increase, less than on the recent extras rise. Western stocks are good except for specialties and the traditional plate shortage.

After a flurry of "scare" price cutting, galvanized sheets have firmed up. Construction strikes in California, the Pacific Northwest and Salt Lake City have slowed the reinforcing bar and structural markets temporarily.



SCALE MODEL of Arnold Engineering Center's \$200 million, 2500 mph propulsion wind tunnel comes in for close study at Los Angeles American Society of Mechanical Engineers meeting. Left to right, ASME Pres. Frederick S. Blackall, Jr., C. M. Sandlund, convention chairman, and J. Calvin Brown, past pres., ASME.





Macwhyte 8-Part Atlas  
Type 1 Round-Braided  
Wire Rope Sling

GREATER SLING FLEXIBILITY THROUGH

# BALANCED BRAIDING

## Macwhyte's Atlas Braided Slings

Atlas Braided Slings have far greater flexibility because of Macwhyte's *balanced* method of construction:

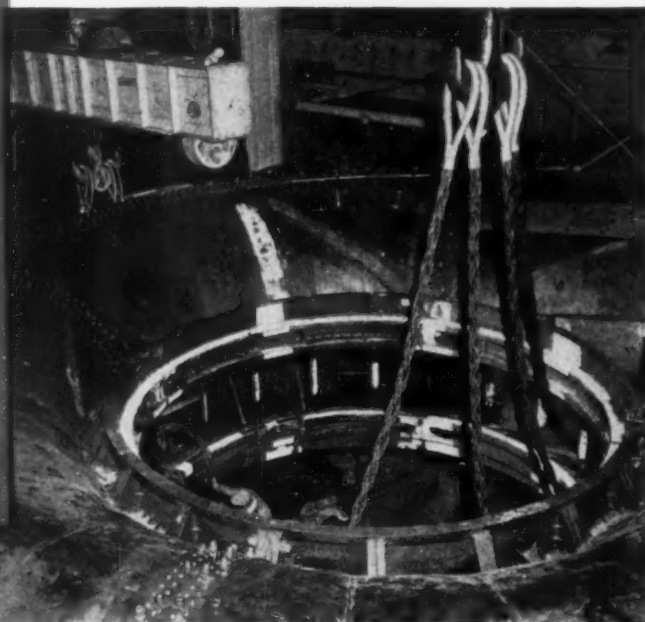
- 1) Ropes are spliced endless before braiding.
- 2) Right lay ropes balance left lay ropes.
- 3) All ropes follow uniform spiral paths, assuring balanced tension throughout the sling body.

Macwhyte's "Balanced Braid" permits fuller, safer gripping . . . no kinking . . . no spinning . . . faster materials handling.

### Complete line of slings for every need

Three body types are available: Atlas Round-Braided, Drew Flat-Braided, Monarch Single-Part. All are made to order in any size for any job.

Our sling engineers will be glad to study your sling needs and make recommendations promptly.



115 Ton Casing Assembly  
Handled with Mac-  
whyte Atlas Type 1,  
Round-Braided Wire  
Rope Slings.

Photo courtesy  
Allis-Chalmers  
Manufacturing Company,  
Milwaukee, Wis.

# MACWHYTE SLINGS

### Ask for New Circular No. 5308

Lists strengths and safe-loads for ATLAS Round-Braided, DREW Flat-Braided, and MONARCH Single-Part Slings.

For cranes and hoists specify PREformed Monarch Whyte Strand Crane Rope made by Macwhyte. Ask for Folder 50-25.



### MACWHYTE COMPANY

2911 Fourteenth Ave., Kenosha, Wisconsin

Manufacturers of Internally Lubricated PRE-formed Wire Rope, Braided Wire Rope Slings, Aircraft Cable, Safe-Lock Assemblies, Monel Metal and Stainless Steel Wire Rope.

Mill depots: New York • Pittsburgh • Chicago  
St. Paul • Fort Worth • Portland • Seattle • San  
Francisco • Los Angeles • Distributors through-  
out U.S.A.

## Seek More Uses for Cold-Forming

Industry is hunting for ways to substitute cold-forming for other production methods . . . GE is now rolling threads on jet turbine shafts . . . Other uses—By E. C. Beaudet.

Cold-forming of metal parts is attracting wider attention throughout industry. More and more companies are considering application of various cold-forming processes to parts previously produced by other methods.

When it can be used, cold-forming has several advantages over other production methods. Operation is faster and savings in both labor and machine time are possible. Better metallurgical properties result, and in some cases work-hardening of the material due to cold-forming makes treatment of the metal after forming unnecessary.

**Lowers Cost . . .** Added to these advantages is the possibility of reduced cost by forming parts from a smaller amount of material. No metal is lost in the form of chips in cold-forming, and the problem of chip elimination and disposal is eliminated. Cleaner operation is another feature.

Industry is increasing its efforts to find ways of extending the use of cold-forming. Fairly recent developments include cold-forming of splines on shafts and cold-rolling nickel seals for jet engine use. For some time, experimentation has been going on to adapt cold-forming to production of jet engine compressor blades.

**Uniform Contours . . .** If problems now holding up refinement of this technique are solved, it will be possible to produce jet compressor blades with more uniform contours and a minimum of subsequent machining operations. Closer accuracy in maintaining contour of the air foil in blades and buckets will be a great step forward in jet engine development.

In the automotive field, contin-

uous experimentation and development of cold-forming methods is going on. One large automaker has started a cold-forming program. All processes are being studied carefully to see if cold-forming can be adapted.

**Rolls Threads . . .** In another aspect of jet engine parts production, General Electric Co.'s Aircraft Gas Turbine Div., at Even-

the thread rolling attachment is moved into position and locked. The shaft rotates in the neighborhood of 1680 rpm and during this rotation the rolls are advanced rapidly until they contact the OD of the shaft. Rolls are then fed forward slowly until they reach the required thread depth.

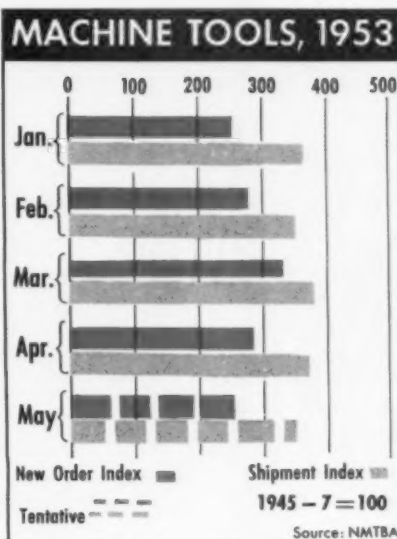
After reaching proper depth they retract from the shaft and return to the starting position. The completely automatic cycle is hydraulically controlled. Forming takes place in about 30 sec.

During the rolling process, metal flows both horizontally and vertically. While machining, the shaft must be turned to a slightly smaller diameter than is required for cut threads because no metal is removed.

Threads are formed by two rolls which work on opposite sides of the shaft. In this manner deflection is lessened. The thread rolling attachment contains two sets of rolls, since two sets of threads are required on different diameters of the shaft. These specially made rolls are said to have a life expectancy of approximately 1000 turbine shafts per set.

**Uncertainty Slows Orders . . .** Uncertainty of the present international situation is holding back a considerable number of civilian orders for machine tools, according to some industry sources. The feeling is that while civilian industries during the first 6 months of the year placed more orders than were anticipated, a larger number of orders would be placed if international tensions were resolved.

Confusion caused by declining defense spending and the constant threat of a return to a peace-time economy is causing some civilian manufacturers to hold off on plant expansion and equipment modernization. Until they see which direction the present international situation will take, these firms are not expected to go all out on expansion and machinery modernization plans.



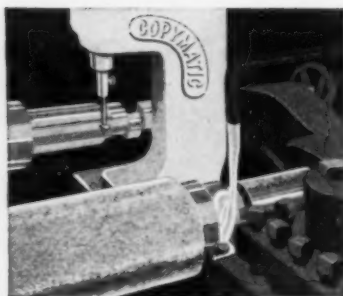
dale, Ohio, recently switched to cold-forming and is now one of the few companies in the jet engine field which threads turbine shafts by rolling rather than by cutting.

The result is that a set of threads can be formed in about 30 sec. as opposed to the 1½ hr needed for cutting.

Threads are formed by a thread-rolling attachment mounted on the backside of a 25 x 96-in. lathe. The attachment does not interfere with other machining operations which are performed on the lathe.

**How It's Done . . .** After turning the proper diameters on the shaft,

**HOW HIGH  
IS UP?**



Perhaps it's "the point toward which manufacturing costs are constantly climbing." What methods may be used to keep costs and prices from vanishing out of sight and reason?

Since time and manpower are the vital elements in costs, many progressive manufacturers are using Lodge & Shipley COPYMATIC Tracer Controlled Lathes to combat rising costs. Carefully verified reports show time savings as high as 87%, production increases up to 536%, savings of \$14,000 in a year.

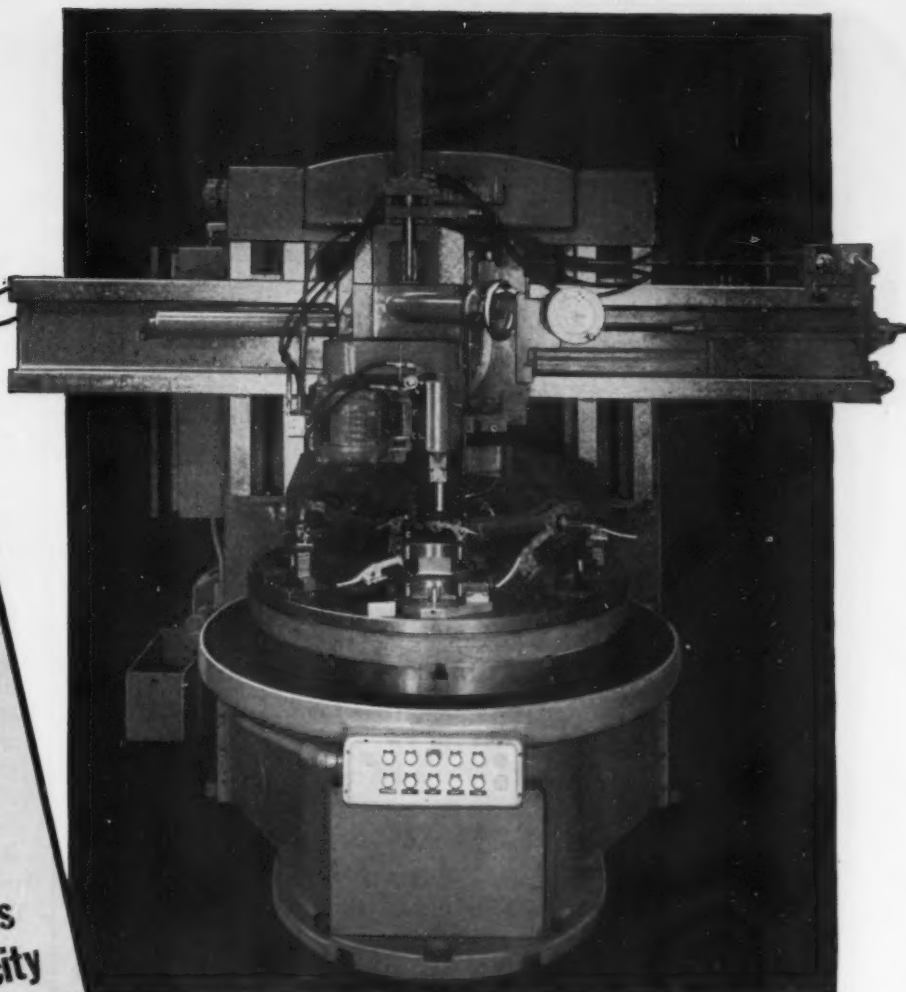
The COPYMATIC is so versatile even smaller shops find it a profitable producer . . . it offers instant changeover from tracer control to engine lathe. A COPYMATIC can save you money, too. Ask for case histories and Bulletin No. 675.

THE **Lodge & Shipley** COMPANY

3061 COLERAIN AVE., CINCINNATI 25, OHIO



PRICE TAG?  
*No!*  
PRECISION TAG?  
*Yes!*  
Grinding to  
less than  
200-millionths  
for concentricity  
and parallelism



Single spindle 1800 Series Frauenthal Grinder, specially engineered for grinding Diesel engine connecting rods . . . typical of numerous operations where the workpiece is large and cumbersome but hole to be ground is relatively small.

## ... another "MILLIONTHS-of-an-inch" Frauenthal Grinder

IT'S the extreme precision to which Frauenthal Grinders work that surprises metalworking leaders who know the potentials of modern speed-and-precision machines. You will be surprised, too, at the savings in time and money you can make with these super-precision grinders!

In both toolroom and production set-ups, simultaneous grinding of inside or outside and faces . . . or boring and turning . . . can now be held to such close precision of par-

allelism and concentricity that measurements of tolerance get down to *fractions-of-ten-thousandths*, best expressed in *millionths* of an inch!

Manufacturers of precision parts for aircraft, jet and automotive engines, tanks, gunmounts, radar units, Diesel connecting rods, plug valves, high precision bearings and other industrial and military parts and assemblies find Frauenthal Grinders profitable investments. You are sure of utmost precision, unfailing interchangeability and speedy, dependable production with these "millionths-of-an-inch" grinders.

Series 1800 available in 4 standard sizes, with 30", 36", 42", or 48" tables and 60" maximum swing. Specially engineered features can be included to fit your requirements.

**Frauenthal**  
MULTIPLE-HEAD  
SUPER-PRECISION  
CYLINDRICAL  
**Grinders**

PRECISION-GROUND INSIDE, OUTSIDE AND FACES  
SIMULTANEOUSLY TO MILLIONTHS OF AN INCH!

write for bulletin

**Frauenthal Division**

THE KAYDON ENGINEERING CORP.

MUSKEGON, MICHIGAN

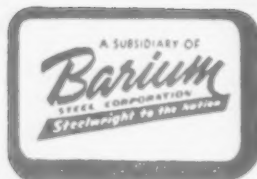
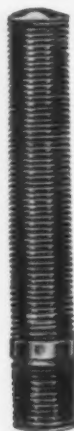
# For **DEPENDABILITY** IN **TRANSPORTATION**



## The Correct Fastener for the Job

These Erie bolts have at least one thing in common—they are designed to hold against maximum strains imposed by pressure, temperature, or corrosion. They differ in material, shape and threading as the job directs. For 38 years, we have geared our plant to manufacture these unusual high quality bolts to exacting specifications.

This broad experience backed by a high desire to be of service to you is your assurance that Erie is ready to meet your special bolting requirements.



**ERIE BOLT and NUT CO.**  
ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS  
ALLOYS • STAINLESS  
CARBON • BRONZE

**Representatives in Principal Cities.**

## —Free Publications—

*Continued*

### Cinder pots

Pictures and texts are used to describe the fabrication and use of Johnston corrugated cinder pots. In addition information is given on recent developments such as convex curved sidewalls, expandable rims, relocation of supporting lugs, copper-coated bottoms inside the pot, and a unique crane hook attachment designed to assure safety of plant personnel when a crane hook is engaged. *Mackintosh-Hemphill Co.*

For free copy circle No. 13 on postcard, p. 103.

### Castings

Facilities of Wellman Bronze & Aluminum Co. for production of a broad range of aluminum, magnesium and bronze alloy castings in sand, semi-permanent and permanent mold form are illustrated and described in a new 20-p. catalog. Metallurgical tables on the characteristics of each alloy, typical castings and data on general laboratory and quality control operations are included. *Wellman Bronze & Aluminum Co.*

For free copy circle No. 14 on postcard, p. 103.

### Gear finishing

Equipment for precision finishing of gears up to 15 ft in diam for marine, railroad, power plant and ordnance use is covered in a new 8-p. bulletin. Advantages claimed for the gear finishing machines described are: Elimination or drastic reduction of lapping; reduction of gear finishing time; use of multiple-thread hobs instead of single thread hobs for hobbing the gear. *Michigan Tool Co.*

For free copy circle No. 15 on postcard, p. 103.

### Electrodes

Air Reduction Co. has made available a 50-p. pocket guide on Airco electrodes. More than 30 different electrodes including stainless, mild and high tensile steels, cast iron, nonferrous, low hydrogen, and hardfacing, are described as to chemical analysis, procedure for welding and application. *Air Reduction Co., Inc.*

For free copy circle No. 16 on postcard, p. 103.

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N AGE

90 mm lower  
pierce die  
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105 mm pierce punch  
nose finish turned  
and polished.



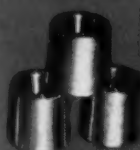
Set of split dies for  
80 mm master shell.



90 mm pierce  
punches finish  
turned on the  
Mona-Matic.  
Hardened to 48-50  
Rockwell C.



90 mm cabbage  
punch produced  
complete on  
"Air-Gage  
Tracer" lathe.

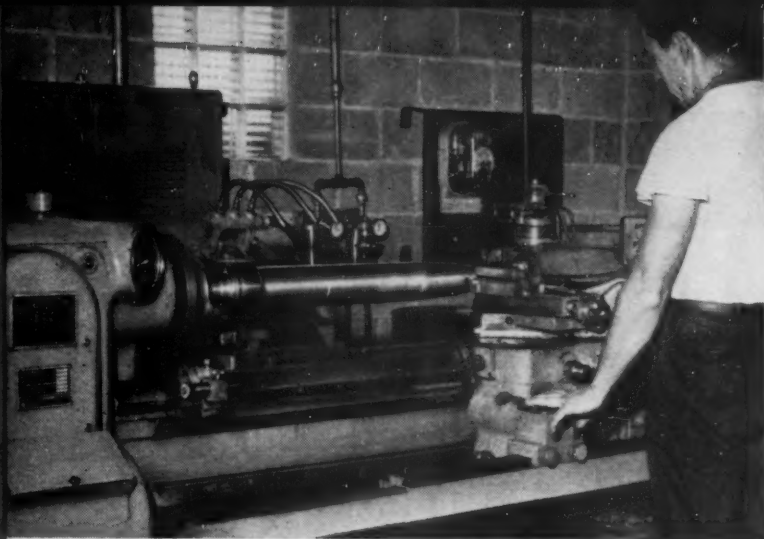


Die inserts  
for 75 mm.



155 mm punch

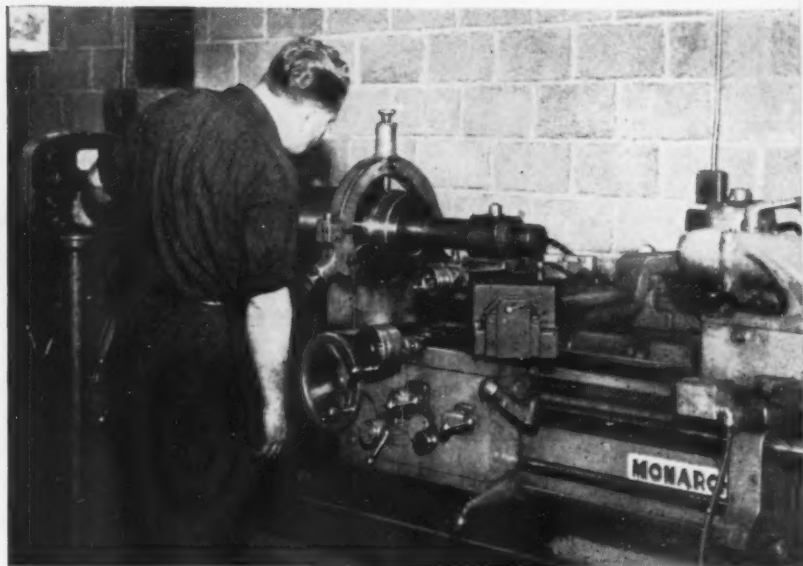
Draw mandrel  
assembly.  
Material hard-  
ened to 48  
Rockwell C.



Rough turning draw  
and pierce mandrels on  
the Mona-Matic. Sizes  
include 90, 105 and  
120 mm shell. Mater-  
ial is hot work die  
steel. Billets often  
weigh up to 210 lbs.  
Depth of roughing cut  
is up to 1/2" on side  
representing a saving  
of 3 hours per piece  
over conventional en-  
gine lathe procedure.  
Finishing cut is taken  
after heat treatment.

## Monarch Air-Gage Tracer Scores GRAND SLAMMO ON THE AMMO

Contour boring die  
liners on a Series 60  
using a 30" long bor-  
ing bar. Material is a  
forged hot work die  
steel billet 10" O.D. x  
20" long. Total toler-  
ance held is .002" to  
.003". The "Air-Gage  
Tracer" method saves  
up to 6 hours per piece.



Just put these two facts together. (1) More  
hot forged tooling for the shell program is  
produced by the Diversey Engineering Co.  
(Franklin Park, Illinois) than by any other  
plant. (2) The turning equipment is ex-  
clusively Monarch, with every machine —  
Mona-Matics, Series 60's, and Heavy Duty  
lathes — Air-Gage Tracer controlled. Some  
of these are swiveling types with Auto Cycle  
Unit. Here, more of these lathes than in any  
other shop doing similar work, produce on  
a 24-hour-a-day, 7-day-a-week schedule.

Significance? This equipment delivers a

200% increase in production compared with  
less modern methods generally employed.  
Its dependability is such that no shell line  
in the country depending on Diversey hot  
forged tooling has failed to keep moving.

This manufacturer currently has on order  
6 additional machines—all sold by the per-  
formance of present equipment. Why not  
take a tip from Diversey and load up with  
production ammunition like this for your-  
self? Just fire us a request for our complete  
Air-Gage Tracer Booklet No. 2606 . . . The  
Monarch Machine Tool Co., Sidney, Ohio.

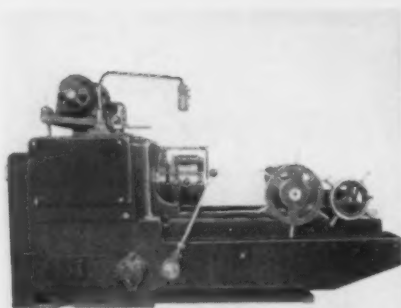
**Monarch**  
TURNING MACHINES

for a Good Turn Faster  
... Turn to Monarch



# NEW EQUIPMENT

New and improved production ideas, equipment services and methods described here offer production economies . . . just fill in and mail the postcard on page 103 or 104.

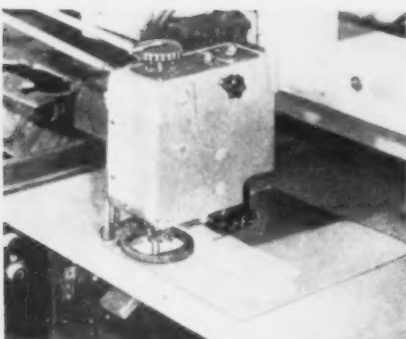


## Precision threading on large diameter work

New massive Landmaco threading machine is a single spindle model, furnished with or without lead-screw attachment. The bed has hardened and ground rectangular ways for guiding and supporting the carriage. New design of carriage front assures proper work alignment under gripping pressure, increases gripping efficiency 60 pct.

Twelve spindle speeds range from 9 to 152 rpm. The machine is equipped with 4-in. standard rotary head or the new 6-in. Lanco head, and will cut bolt threads from 1½ to 6⅝ in. diam and pipe threads from 1 to 6 in. diam, up to 29 in. long with leadscrew. *Landis Machine Co.*

For more data circle No. 17 on postcard, p. 104.

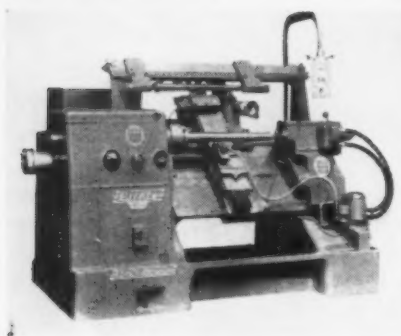


## Automatic tracer assures precise shape-cutting

A wide variety of metal shapes can be cut quickly and precisely with the Oxweld automatic tracer mounted on an oxyacetylene shape-cutting machine. The tracer accurately reproduces the shape of any template, even when the design is intricate or tricky. Templates are easy to make. The desired

shape is drawn to actual size on a plastic sheet and cut out with scissors or knife. No need to allow for kerf, as compensation for kerf width up to ¼ in. wide is accomplished automatically by presetting a dial on the tracer. *Linde Air Products Co.*

For more data circle No. 18 on postcard, p. 104.

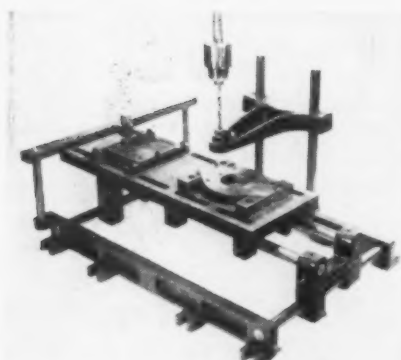


## Pushbutton metal turning becomes a reality

The H. E. B. Pilote is an automatic hydraulic copying lathe, equipped with a hydraulic carriage feed. The operator has only to load the machine and press the button to start the cycle. When the part is finished the tool returns to its starting position and the spindle stops automatically. Developed and produced in France, the Pilote has all the ad-

vantages of any single spindle automatic lathe, but setup can be completely changed in less than 1 hr. Tooling is simple and there are no careful adjustments to be made. Roughing and finishing may be carried out at the same operation by utilizing one or more tools. *H. E. B. Machine Tools, Inc.*

For more data circle No. 19 on postcard, p. 104.



## Device gives jig boring accuracy to drill press

Low-cost, high-standard accuracy in production drilling is possible with a new hole locating device, the Production Master. It is claimed to eliminate much costly jig and fixture designing and building common in punch and die making and in production drilling. This versatile accessory tool makes any standard drill press produce accuracy

commensurate to jig drilling and reaming, and jig boring. It will handle work up to 6¾ x 10 in. x the height permitted by the drill press. It has an alloy cast iron base, and table, heat treated ground shafting, and standard tool steel drill bushings. *Honnef Engineering Co.*

For more data circle No. 20 on postcard, p. 104.

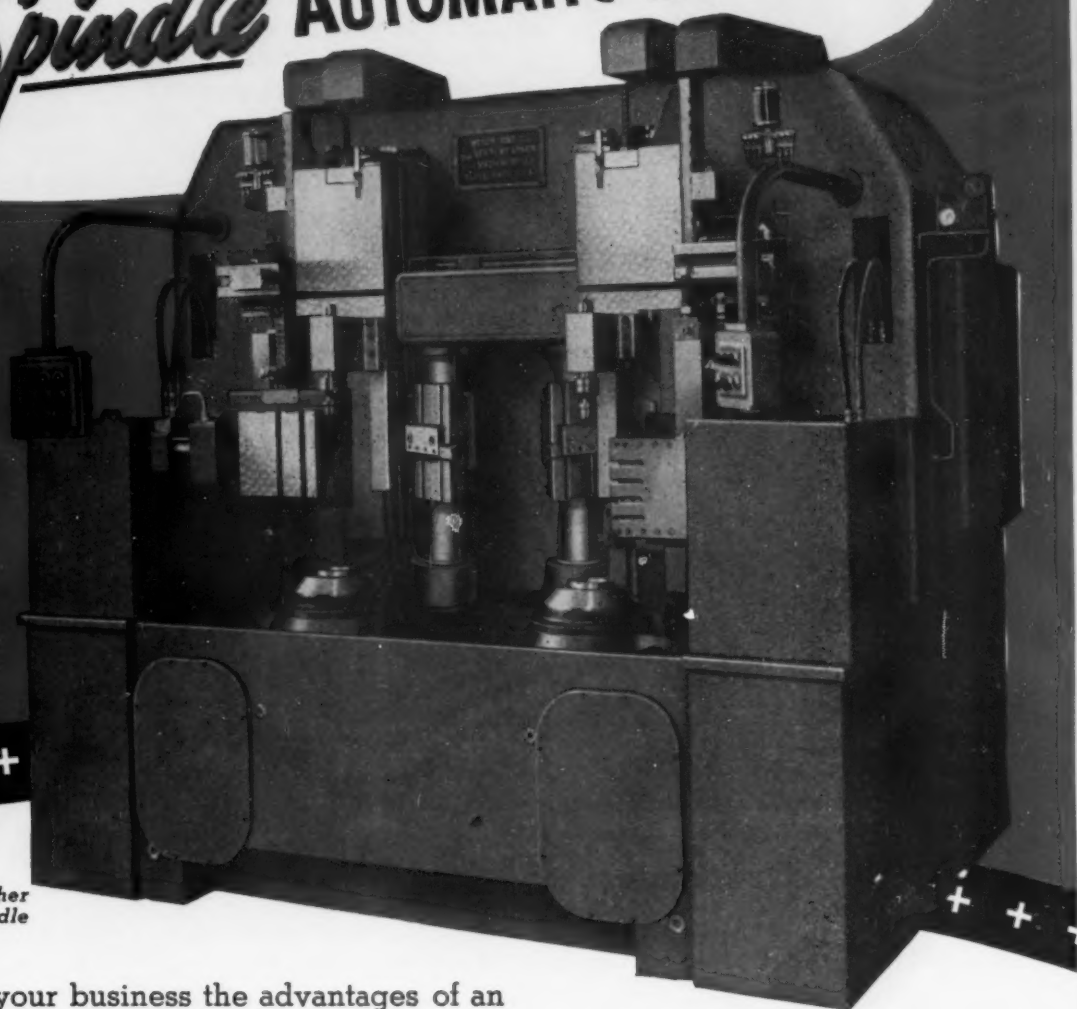
Turn Page

# Obtain **PLUS** Values from the **MATCH & MERRYWEATHER** **Twin-Spindle** AUTOMATIC LATHE...

**GET PLUS  
PRODUCTION!**

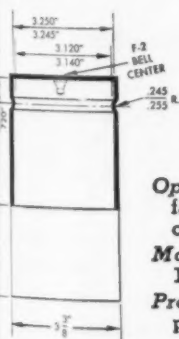
**GET PLUS  
ACCURACY!**

**GET PLUS  
PROFITS!**



**Match & Merryweather  
VTBF-12 Twin Spindle  
Automatic Lathe.**

Command for your business the advantages of an automatic turning-boring-facing cycle with precision — *plus* the value of *twin yet independent* spindles — *plus* the value of vertical facility for handling parts. These machines are accurate, rugged, and dependable, yet simple to set up.

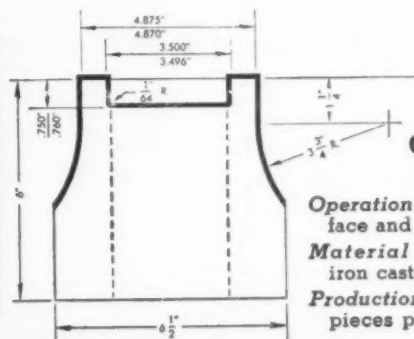


**Case Study  
No. 96**

**Operation** — Turn, face, groove and center drill.

**Material** — SAE 1335 annealed.

**Production** — 124 pieces per hour.



**Case Study  
No. 124**

**Operation** — Turn, face and bore.

**Material** — Gray iron casting.

**Production** — 60 pieces per hour.

## STANDARD SPECIFICATIONS

Chuck diameter	10"
Swing	12" dia.
Work height: chucking	12"
between centers	16"
Turning slide, vertical feed	14"
Boring slide, vertical feed	14"
Facing slide, horizontal swing	6"

★ ★ ★

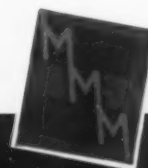
Individual, selective hydraulic feed for each slide. . . . Special variations to meet individual requirements. . . . Simple contours by cam-operated tools. . . . Tracer control can be added.

Manufactured by — **THE MATCH & MERRYWEATHER MACHINERY CO.** —

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

**PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT**





### King-size dc power source for electroplating

A single cubicle selenium rectifier with an output capacity of 30,000 amp of dc power at 12 v, and occupying only 96 sq ft of floor space, will furnish low voltage dc power for electroplating nickel-lined steel pipe for AEC projects. To eliminate costly maintenance, the huge rectifier is sealed and gasketed for

protection against the corrosive atmosphere commonly found in plating plants. An interior temperature of 95°F will be maintained regardless of outside conditions. The rectifier is a Reactronic unit—completely eliminates moving parts. *Bart-Messing Corp.*

For more data circle No. 21 on postcard, p. 101.



### Mobile ramp facilitates loading of yard cars

An all-magnesium mobile loading ramp makes possible full utilization of power trucks in the loading of yard cars. Combining the strength of magnesium with its extreme lightness, the ramp is engineered to support loads of 13,000 lb, or more

where required. One man can move it about the area with ease. It measures 30 ft long x 6 ft wide. Hydraulic lifting mechanism raises the ramp to any car level quickly and easily. *Magline Inc.*

For more data circle No. 22 on postcard, p. 101.



### Checks critical dimensions on jet engine blades

An air gage assembly is used to check critical dimensions on a jet engine turbine bucket blade simultaneously. In one quick step an unskilled operator can check blade taper in relation to root form at three places along the leading and trailing edges and measure the

length of the root form. The assembly consists of blade positioning fixture, 7 Plunjet gaging cartridges, and a 7 column Precisionaire. Accuracy of each dimension is indicated by the position of floats in the Precisionaire. *Sheffield Corp.*

For more data circle No. 23 on postcard, p. 101.

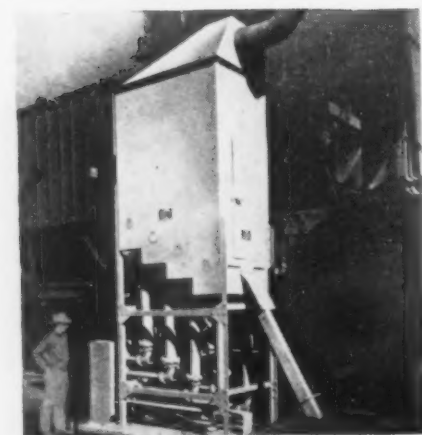


### Proportioner for combustion air and gas

Series 630 proportioner is a relay controlled air operated cross-connected governor, an inexpensive device designed to accurately proportion large quantities of low pressure gas and air used for combustion. It may be installed in either a gas or an air line of any standard 4 to 16 in. pipe. It consists of a butterfly valve operated by an air motor and controlled by a relay

receiving pressure impulses from both gas and air lines. Valve is nondirectional; gas and air may be passed through it in either direction. Proportioner may be mounted in a horizontal or vertical run of pipe. Capacities at a pressure drop of only 1 oz per sq in. range from 24,100 cfh of air to 385,000 cfh. *North American Mfg. Co.*

For more data circle No. 24 on postcard, p. 101.



### New sand for old with pneumatic reclamation

A sand recovery system for the reclamation of used or burnt-out foundry sand has been developed. Air introduced through a turbine type blower supplies the motive force. Scrubbing action is achieved through impact of sand grain against sand grain. Continuous cycling and dry scrubbing through a series of cells returns sand to condition ready for rebonding and reuse in molds or cores. Fines and used bonding materials are removed

through exhaust system. Savings in cost of new sand and bonding materials are reported. Extreme simplicity of design and operation allows nominal cost. Lack of moving parts insures low maintenance. Sand can be re-used immediately without draining, drying or cooling. The Standard scrubber occupies 16 x 19 x 5 ft. *National Engineering Co.*

For more data circle No. 25 on postcard, p. 102.

Turn Page



# Vanadium-Alloys

brand names

that deliver

*Distinctive  
Performance*

on your **cold work** die jobs!

It pays to *buy by brand*—when the brand-name speaks for *extra performance on the job*. As makers of First Quality tool steels exclusively, we say: buy Vanadium-Alloys' steels by name—and get the values added to each composition by our *specialized process of manufacture* . . . values that are physical, measurable, and profit-making for you!



**Vanadium-Alloys**

STEEL COMPANY

**LATROBE, PENNA.**

Colonial Steel Division

Anchor Drawn Steel Co.

## \* Non-Shrinkable Colonial No. 6

Non-Deforming, Oil Hardening Die Steel having excellent machining properties; low hardening temperature. Popularly used for blanking punches and dies, gauges, bushings, and miscellaneous tools.

## \* Air Hard

5% Chromium Steel with minimum distortion in air hardening. Especially adapted for better wear and toughness in thread rolling dies, form and blanking dies, punches, knurls, gauges.

## \* Ohio Die

Air Hardening, High Carbon-High Chromium Steel. Free from movement in hardening, combines high wear resistance and toughness for difficult jobs. Your choice on trimming dies, shear blades, coining dies, rolls and mandrels.

## \* Crocar

High Carbon-High Chromium Die Steel with outstanding resistance to wear. Can be either air or oil hardened. Select this grade for lamination dies, wear plates, slitting cutters, and forming dies.

## \* Red Star Tungsten

An unusual Oil Hardening Die Steel. Maintains keen cutting edges; excellent for punches, taps, blanking dies, spinning tools, and slitters.



9 to 5 could become 9 to nightmare if business machines were subject to frequent, inconvenient and costly breakdowns. Beryllium copper helps eliminate service failures, keeps customers happy. For parts and key numbers, see below.

## BUSINESS MACHINES HAVE THE RIGHT ANSWER

### Beryllium copper helps manufacturers solve the problem of conflicting physical requirements

Business machines can sort information, read it, count it, remember it, print it—automatically, reliably, and with little service attention. Remarkable! No more so, however, than the alloy which makes this performance possible—beryllium copper. Here, in one metal, are combined such properties as strength, conductivity, fatigue resistance, elasticity.

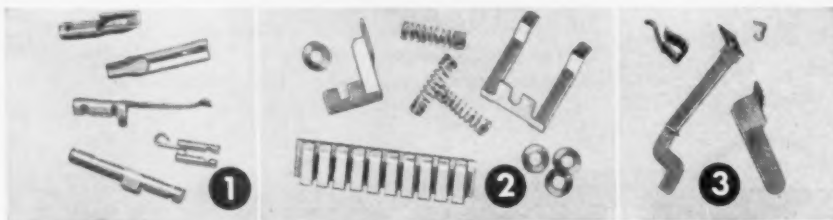
Since a designer must often solve conflicting mechanical, electrical and service requirements with one material, it is this versatility of Berylco which makes it so valuable. Take the part at the top in the photograph numbered (1) below—a “shovel” contact in a business machine.

Electrical conductivity here is a must. So is corrosion resistance—to enable the machine to operate in

any climate. The contact must be able to withstand severe forming (there's a tolerance plus or minus of 0.001 in. on a diameter of 0.098 in.). The shovel end must have wear resistance to withstand the spring action of the prong that fits against it. The barrel end must have enough elasticity to retain a plug tightly. Finally, the part must not fracture when the ears are bent placing it in the control panel. No other available material but Berylco beryllium copper could meet these requirements.

Fortunately this alloy is again in plentiful supply. For sample material or engineering help, write the world's largest producer of beryllium copper, THE BERYLLIUM CORPORATION, Dept. 3-G, Reading 6, Pa.

*Tomorrow's products are planned today—with Berylco beryllium copper*



(1) Berylco parts in an IBM accounting machine. (2) Calculators solve mechanical, electrical and spring requirements with one material—Berylco. (3) Small parts play big roles in voice recorders.

## —New Equipment— Continued

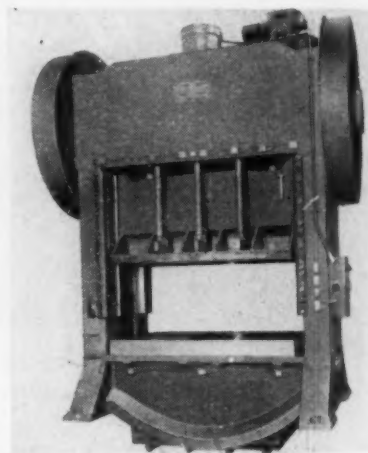
### Strippable lining

Narliner strippable liner for vacuum coating tanks is a synthetic liquid resin which is applied to the inside of the tanks by brushing or spraying. Metal accumulations from the vacuum metallizing process in the interior of the coating tank can be removed periodically by merely stripping the plastic coating away from the coating tank; short metallizing cycles are thus maintained. *National Research Corp.*

For more data circle No. 26 on postcard, p. 181.

### Power press

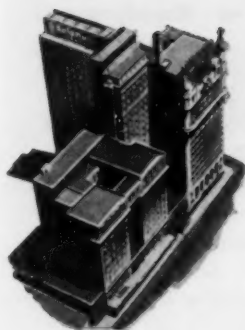
New straight sided double crank press has double geared, twin drive equipped with two station electrically controlled air operated drum type clutch with spring loaded brake. An air counterbalance to the slide and the flywheel is provided with an auxiliary air brake to bring it to a quick stop when the power is shut off. The bed of the press is arranged with a 91-ton pneumatic cushion in two units,



with air manifold controls, so that cushions may be operated independently of each other. The press has a stroke of 16 in., 12 in. adjustment to the slide, 32 in. distance bed to slide, stroke up and adjustment down, 60 x 96 in. bed and slide area. Capacity is 525 tons. Gears run in a bath of oil and the drive is by multiple V belts from motor to flywheel. *Cleveland Punch & Shear Works Co.*

For more data circle No. 27 on postcard, p. 181.

Turn Page



DALLAS  
*The Adolphus*



CINCINNATI  
*Netherland Plaza & Terrace Plaza*



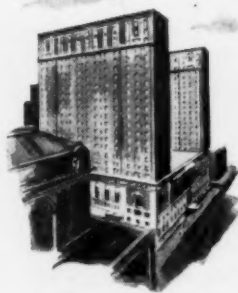
CHICAGO  
*The Drake*



ST. LOUIS  
*Chase & Park Plaza*



BALTIMORE  
*Lord Baltimore*



NEW YORK  
*Hotel Commodore*

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of 9 cities  
and their  
*Distinguished  
Hotels*

This is a story of nine independently owned and operated hotels, now offering you the added convenience of free teletype reservation service with immediate confirmation. In *this* they are alike — but each one interprets good living and hospitality in a unique and distinct manner to increase the pleasure of your visit!

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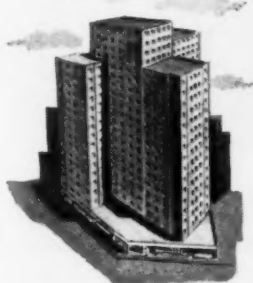
CHICAGO: 77 W. Wash'n St., RAndolph 6-0625

BOSTON: 73 Tremont St., LAfayette 3-4497

WASHINGTON: Investment Bldg., REpublic 7-2642  
... and in Los Angeles, San Francisco and Seattle —  
Glen W. Fawcett Assoc.



BOSTON  
*Parker House*



PITTSBURGH  
*Carlton House*



ATLANTIC CITY  
*Chalfonte-Haddon Hall*





improved stud welding  
through **KSM** engineering



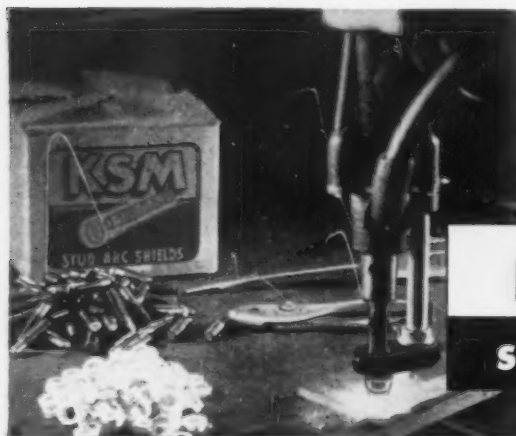
Flux is an important factor in stud welding. Good results start with the right amount at the proper point.

KSM developed solid fluxed studs because a solid mass is controlled to extremely close tolerances. This means the flux is uniform in amount and distribution . . . is precisely and securely centered . . . and its presence can be readily seen by the operator.

Using KSM Arc Welding Studs, you can be sure each has exactly the right amount of flux evenly distributed at the proper point. Welds won't tear out because flux powders shifted.

This concentration of flux at the right point in KSM Studs produces fast, clean, always-perfect stud welding . . . makes the rough jobs easy and cuts costs.

Write for complete information. KSM Products, Inc., Merchantville, N. J.

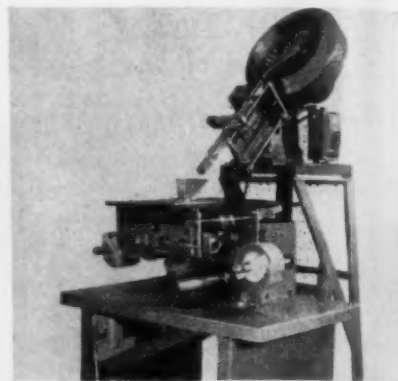


**K S M**  
**STUD WELDING**

## —New Equipment— Continued

### Rapid packaging

Over 60 filled packages per min can be delivered through the latest attachment to the Auto-Pak. The attachment feeds hardware, electrical and similar products to the Auto-Pak which automatically



forms two sheets of heat sealing material around the items, seals the four sides, cuts off and delivers a completely sealed package. The unit plugs into an ordinary light circuit, makes packages from 1-in. square x 1/2 in. thick to 6 in. square, is simple and economical to operate. **Pak-Rapid, Inc.**

For more data circle No. 28 on postcard, p. 102.

### Spot-gun welder

Portable spot-gun welder from Great Britain does all types of on-the-spot jobs; is portable and weighs only 25 lb. Squeezing of the toggle grip obtains high forging pressure at the tips, and simple depression of a trigger switch pro-



duces a perfect spot-weld in a fraction of a second. With nine assorted heavy copper extension arms and two clamps, spot welding can be produced at different angles, and in difficult positions, with reaches from 5 to 24 in. **C. F. Carpenter.**

For more data circle No. 29 on postcard, p. 102.

Turn Page

# Acme Steel Strapping Insures S.A. *(Safe Arrival)*

**Strapped shipping cartons pass Maytag Co. torture tests**



**BOUNCED AND BATTERED.** Acme Steel Strapping holds securely as fibreboard shipping carton is vibrated and then butted on each side and bottom in Maytag Company "torture chamber."

The Maytag Company of Newton, Iowa, insures S.A. (Safe Arrival) of all its automatic washers by using Acme Steel Strapping both to seal fibreboard shipping cartons, and then to anchor those cartons securely in freight cars.

The strapped carton method was adopted only after torture tests proved it superior to other methods.

An added advantage is that packing the Maytag Automatic with Acme Steel Strapping takes less than half as much manpower as a similar Maytag operation employing previous packing methods.

If you have a packaging problem, chances are Acme Steel Strapping or Acme Steel Stitching Wire methods can provide just the solution you need. Telephone your Acme Steel representative, or write Acme Steel Products Div., Dept. IA73, Acme Steel Company, 2840 Archer Ave., Chicago 8, Illinois.



**MINIMUM MANPOWER.** Top and bottom caps on carton containing Maytag automatic washer are each secured by one turn of 3/4-in. Acme Steel Strapping. Straps are tensioned by push-button operated Acme Steel pneumatic stretcher.



**FINAL STEP.** After strapped cartons move speedily and safely through packaging department, they are loaded into freight cars and quickly anchored with Acme Steel Strapping.

**ACME  
STEEL**

**STRAP IT... STITCH IT... SHIP IT... SAFELY!**

July 9, 1953

115

## Guarantee

We guarantee that Pittsburgh ARMORED GEARS, of our own laboratory specification steel and Armoring will give an average service life:

1. FIVE TIMES THAT OF UNTREATED GEARS.
2. ONE TO ONE AND ONE HALF TIMES THAT OF OIL TREATED GEARS, and
3. EQUAL OR SUPERIOR TO THE AVERAGE SERVICE LIFE OF ANY OTHER HEAT TREATED GEAR IN IDENTICAL SERVICE.



## that's right...

Pittsburgh ARMORED GEARS are sold to you with this positive guarantee of satisfactory service. It means that they will give you longer service, fewer work-stoppages, and lower operating costs.

There is a reason for the longer life of Pittsburgh ARMORED GEARS. It comes from a combination of the correct metal, quality machining, PLUS a process of heat-treating that hardens the wearing surfaces but leaves the core tough and shock-resistant.

Next time try a Pittsburgh ARMORED GEAR. You can identify it by its exclusive Pittsburgh purple protective coating. Let it prove its worth. Then standardize on these guaranteed gears for continued savings. Send your specifications to us today for quotation on one or any quantity of gears you need. We'll give you prompt service.

Look for "Pittsburgh Purple" on the gears you buy.

SPUR, MITRE  
HELICAL  
HERRINGBONE  
WORM GEARS  
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the RIGHT hardness  
in the RIGHT places

**PITTSBURGH GEAR**  
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## New Equipment

Continued

### All-purpose truck

The features and advantages of both a heavy duty hand truck and platform truck are combined in the all-purpose truck. Telescoping handle bars permit change from hand to platform truck, or vice versa, in

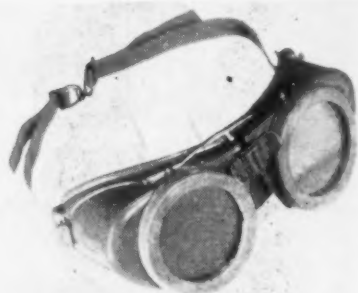


less than 6 sec. The removable shoe allows the carrying of long bulky loads; provides a straight flat bed as a platform truck. Entire unit is strength welded throughout and has capacity of 900 lb as a hand truck; 1700 lb as platform truck. Universal Welding & Engineering Co.

For more data circle No. 30 on postcard, p. 143.

### Non-fogging goggles

Continuous circulation of fresh air keeps lenses of the Oxweld No. 24 coverall goggles clean, even in hot, damp weather. Sixteen vents, lo-



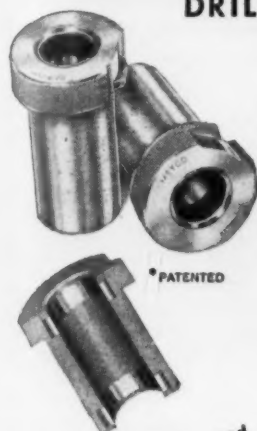
cated behind the lens retaining rings, permit fresh air to circulate across the inside surface of the lenses. Goggles fit comfortably over all corrective eyeglasses. Linde Air Products Co.

For more data circle No. 31 on postcard, p. 143.

Turn Page



# INCREASE PRODUCTION.. SAVE TIME & MONEY ON YOUR DRILLING OPERATIONS



\*PATENTED

For information and  
prices write for Meyco  
Bushing Catalog No. 31



W. F. MEYERS CO., INC., BEDFORD, INDIANA

## MEYCO

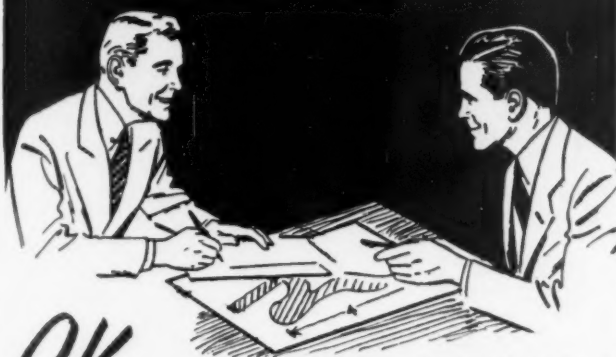
Carbide Inserted Bushings  
last longer, cost less  
in the long run

Here is a bushing that combines the best features of steel and carbide: the strength of steel and the long life of carbide. First cost: slightly higher than ordinary steel bushings; their life: many, many times as great. In addition to such obvious savings, MEYCO bushings increase the life of drills and reamers, produce accurate work for a longer period of time, save on machine-down time and on nonproductive man-hours.



Auto manufacturer says: "... the steel bushings previously used averaged about 28 hours life. MEYCO bushings ran 1,168 hours before they were unusable."

## "A FORGING WILL DO IT"



## OK contact BILLINGS

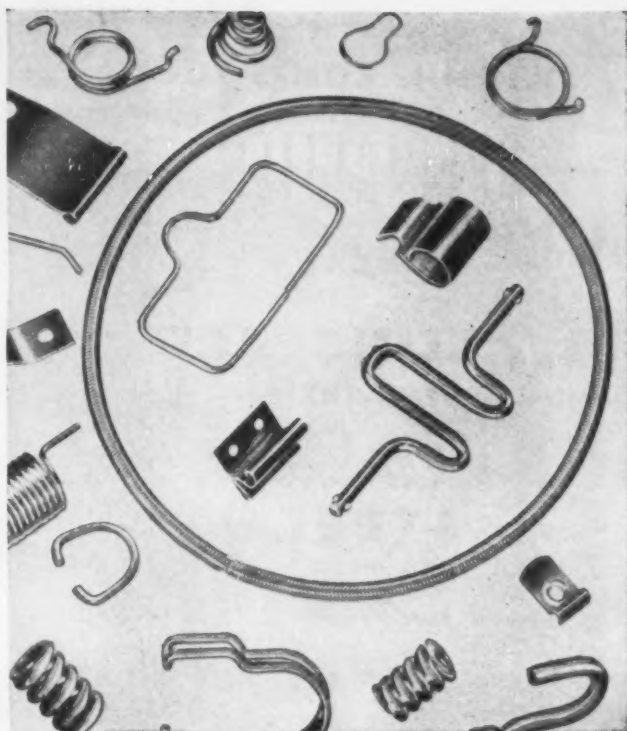
Skilled forging engineers are ready to assist in producing forgings correct in dimensions and with the maximum physical properties necessary for the job intended.

Our hammers talk production!

Send prints or specs  
to 40 Laurel St.

# BILLINGS

C2  
THE BILLINGS & SPENCER CO. HARTFORD, CONN. U.S.A.  
WINCHES • SHOP TOOLS • INDUSTRIAL FORGINGS



COIL SPRING SAYS:  
We really mow  
down your spring  
problems



One of our many services, most valued by our customers is the help we provide in solving their spring problems. Product application, cost or supply—our modern facilities and skilled workmanship combine to provide you with the right spring, wire form or small metal stamping to meet your most exacting needs. You'll appreciate the prompt attention we give to your job.

No order too large or too small!

The U. S. STEEL WIRE SPRING Co.

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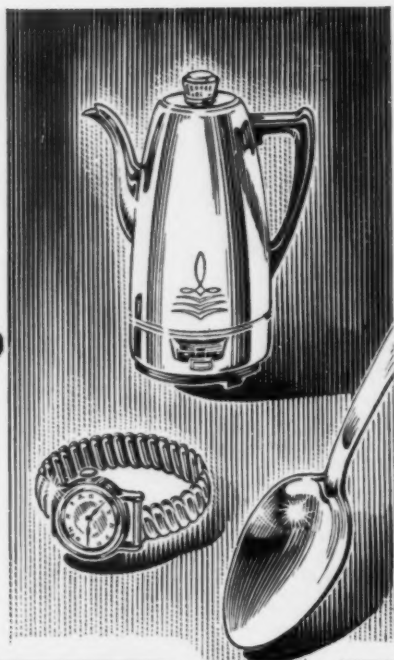
CLEVELAND 5, OHIO

WHEN IT COMES TO  
SPECIALTIES  
COME TO  
**WALLINGFORD**  
FOR THE  
*Stainless*  
**STEEL**  
*Strip*



Cost-Minded  
Production  
**MEN**  
Specify  
Wallingford Steel  
because . . .  
They Know It  
Gages Uniformly,  
Is Correctly Tempered,  
Draws Easily,  
Punches Cleanly  
and  
Lot after Lot  
is a  
Consistently Dependable  
Product  
Available  
.002 and heavier

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LOW CARBON  
HIGH CARBON  
ALLOY  
STAINLESS  
STRIP and TUBING

—New Equipment—  
Continued

**Hydraulic jack**

New 35-ton hydraulic jack is designed to fill the need for a smooth-working, easy-to-operate jack to lift and push heavy machinery and



equipment. An air vent eliminates 90 pct of air lock difficulty. The jack weighs 55 lb, is 9.7 in. high when closed and has a 6-in. rise. *Duff-Norton Mfg. Co.*

For more data circle No. 32 on postcard, p. 103.

**Manual lift truck**

Turnabout-Ajust-A-Fork lift truck features forks that are easily interchanged. Five standard fork lengths, 20, 36, 42, 48 and 60 in., are available. Trucks and forks may be purchased individually. A simple adjustment on the truck frame provides a 25 or 27-in. fork position width. Capacity is 2500

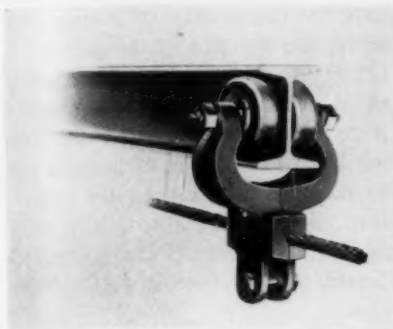


lb, weight, 299 lb. Truck has full 270° steering arc. The Turnabout has lowered height of 3¼ in. and a 4-in. lift. Heavy duty floor lock built into the base of the handle securely brakes the truck when the handle is held in horizontal position. *Rack Hydraulic Equipment Corp.*

For more data circle No. 33 on postcard, p. 103.

## Cable conveyor

Greatly increased capacity is claimed for a new Buschman conveyor that has  $\frac{3}{8}$  in. cable. The trolleys are rated at 100 and 200 lb capacity per trolley for standard and Dubl-Duty wheels respectively, operating on standard 3-in. I beam

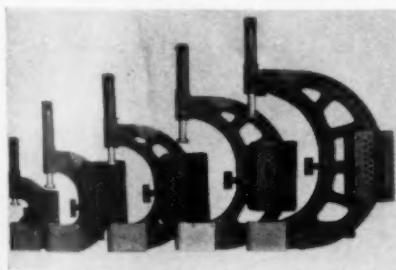


track. The conveyor uses  $\frac{3}{8}$  in. diam preformed 7x19 special aircraft cable with standard trolley spacing of 16 in. on immovable centers, Bush-Lock bushings which are swaged onto the cable under high pressure. *E. W. Buschman Co.*

For more data circle No. 34 on postcard, p. 103.

## Air snap gage

New adjustable air snap gage is a contact type gage; the workpiece is positioned directly on the flat, tungsten carbide gage anvils and the user can feel when the piece is in the gaging head correctly. The air jet does not contact the work-



piece, but, instead is located in the sensitive anvil assembly. The frictionless movement of this anvil is read on the dial of Federal's Dimensionair, an extra-sensitive instrument which gives a direct reading to the nearest 0.00005 in. It is possible to cover a capacity from zero to 6 in. with only five sizes. *Federal Products Corp.*

For more data circle No. 35 on postcard, p. 103.

Turn Page

# KELLER Air Tools

## for high speed assembly



### ANOTHER EXAMPLE OF KELLER Air Tools engineered to industry

Wherever parts are assembled with screws, nuts, bolts or rivets, the use of Keller Tools speeds up production, reduces costs, and makes work easier.

For example, in assembling record players (shown above), changing to Keller Air Tools made the work easier and faster, and substantially reduced production costs.

### FACTS IN BRIEF

ABOUT KELLER PNEUMATIC SCREW DRIVERS

Interchangeable parts

Reduce operator fatigue

Clutches, socket drivers, 45° and 90° attachments for every purpose



Weigh less

Consume less air

Need fewer "back-up" parts in the tool room

Wide variety of handles, gearings, torques, speeds

### Send for FREE 36-Page Booklet

for more information and interesting ideas on air tool application

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Please send me a free copy of your booklet on Pneumatic Screw Driving and Nut Setting Tools

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July 9, 1953



You get **UNIFORMITY** from start to finish with

**KEYSTONE**

"SPECIAL PROCESSED"  
**COLD HEADING WIRE**



When you use Keystone "Special Processed" Cold Heading Wire, you get uniform response every step of the way through forming, trimming, threading and final heat treatment.

Uniform, strength-giving grain flow characteristics are clearly indicated in the above macrograph of a high-strength cap screw made from Keystone "Special Processed" C1035 Cold Heading Wire. The long, continuous fibres tell the "inside story" of efficient cold heading which results in longer die life, lower production costs and finished products of the highest quality.

**INDUSTRIAL WIRE SPECIALISTS**

**Keystone Steel & Wire Company**  
PEORIA 7, ILLINOIS



—New Equipment—  
Continued

**Hardfacing unit**

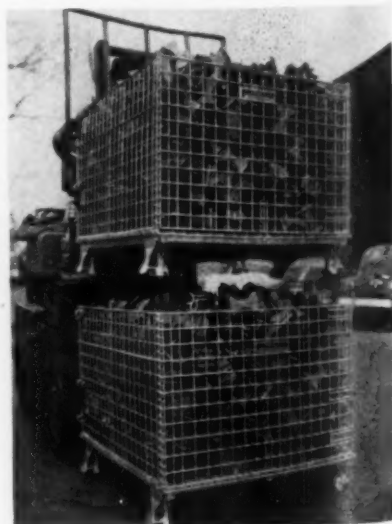
An automatic Heliweld hardfacing unit uses the standard automatic Heliweld head and a unit for feeding bulk tungsten carbide. Its use for the deposition of tungsten carbide hardfacing material is limited only by the ability to position the work and the arc in the proper relationship to each other. Manner of deposition of loose, granular, pure tungsten carbide particles minimizes reduction of particle size by solution of the tungsten carbide into the base metal. It also minimizes the heat-affected area adjacent to the deposit. *Air Reduction.*

For more data circle No. 36 on postcard, p. 103.

**Handling bulky loads**

Named Hi-Lode, a new handling unit for production, shipping and storage operations provides extra capacity for bulky materials through elimination from the undercarriage of center legs and leg braces. Loads can be heaped well above the top rod. Malleable steel corner legs and new frame design of U-channel beams assure rigidity and solidity in stacking. The Hi-Lode features electro-welded, reinforced, steel rod construction with 8-way entry for fork trucks. Available in 2000, 4000 and 6000 lb capacity. *Union Steel Products Co.*

For more data circle No. 37 on postcard, p. 103.



# The Iron Age

## SALUTES

*John David Wright*

He combines hard work and team play with an instinctive knowledge of the right thing to do.



CLOSE friends say Dave Wright really gets uncomfortable when people treat him like a big shot. The soft-spoken 48-year-old president of Thompson Products has earned his reputation as an unassuming guy, but he definitely is a big shot.

John David Wright was born in Pittsburgh and moved to the Cleveland area while still a boy. After winning his law degree at Western Reserve in 1929, Wright went to work for an Ohio law firm.

From 1930 to 1937 Dave served as an instructor in tax law at his alma mater. His decision to specialize in tax law led indirectly to a position with Thompson. It all happened because Board Chairman Frederick C. Crawford, then president of the firm, was impressed by the brilliant way in which Dave handled Thompson's legal affairs.

Dave joined the Thompson team in 1933 as assistant to the president. He was elected president himself early this year after holding a number of responsible positions in the firm during depression and war years.

Dave believes team work and hard work are the real starting points for any successful business philosophy. Fred Crawford, an industrialist and civic servant of international repute himself, recently paid Dave a fine tribute.

Commenting on his successor's versatility Mr. Crawford said, "Dave doesn't have to think; he instinctively knows the right thing to do."

His hobbies are music, tennis, and golf.

the  
switch  
is to  
**STAINLESS-  
CLAD  
PLATES**

for lower costs...  
extension of material supplies

More and more, economy-minded buyers are switching to Stainless-Clad Steel Plates as an effective means of extending supplies of critical materials and of beating the high cost of stainless steel.

They find that in numerous types of fabrication these plates give them all the advantages of stainless steel, including high resistance to corrosion—yet with considerable savings in material costs.

Stainless-Clad Plates made by Claymont are a composite of stainless steel permanently bonded to carbon or alloy steel plate. They're easy to fabricate; will not buckle, crack or peel under the severest forming operations. Stainless cladding may be of any specified percentage of total plate from 10% to 50%.

Other Claymont products include Flanged and Dished Heads, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

To order, write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado

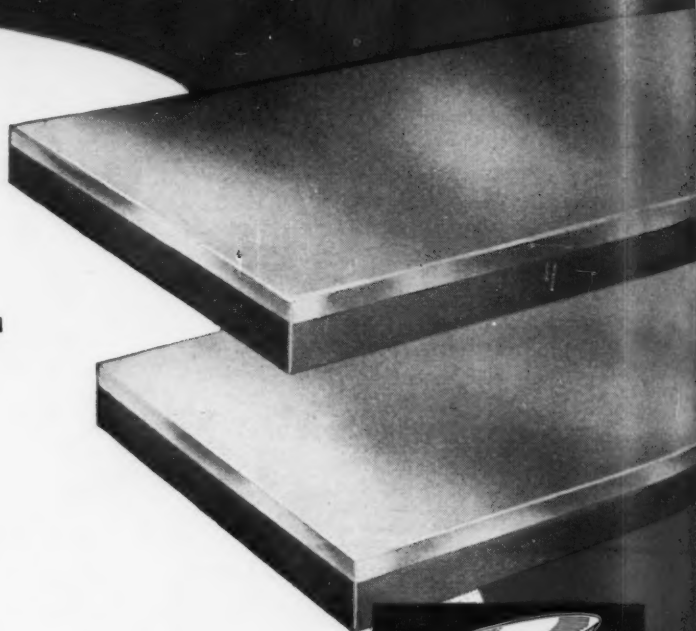
THE CALIFORNIA WIRE CLOTH CORPORATION—Oakland, California

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New York • Philadelphia

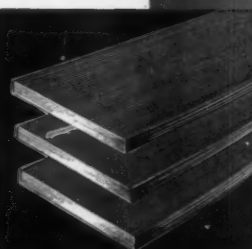
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**CLAYMONT STEEL PRODUCTS**

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION  
THE COLORADO FUEL AND IRON CORPORATION



Flanged and Dished Heads



Carbon and Alloy Steel Plates



Large diameter steel pipe



# The Iron Age

## INTRODUCES

**L. B. Hunter**, appointed president, Inland Steel Container Co., a division of INLAND STEEL CO.; and **William A. Jahn**, elected president, Inland Steel Products Co., another subsidiary.

**W. U. Reisinger**, elected president, REM-CRU TITANIUM, INC., Midland, Pa.

**Philip A. Roth**, elected to membership on the board, THE MIDVALE CO., Midvale, Ohio.

**Anson B. Nixon**, elected chairman of the board, HERCULES POWDER CO., Wilmington, Del.

**Roy Rumbaugh**, appointed director of sales engineering, KLEM CHEMICALS, INC., Dearborn, Mich.

**Frederick W. Seitz**, named secretary-treasurer, BROOKS & PERKINS, INC., Detroit.

**Floyd V. Snodgrass**, appointed to a special administrative post supervising production and operation, at Oakland and Sulphur Springs, ROCKWELL MFG. CO., Pittsburgh.

**Dr. John J. Grebe**, appointed director of nuclear research and development, THE DOW CHEMICAL CO., Midland, Mich.

**R. J. Maxey**, appointed to the post of special assignment on the staff of the vice-president, THE HENNEY MOTOR CO., Freeport, Ill.

**G. W. Snyder**, appointed assistant superintendent, Cold Strip & Sheet Depts., Midland Works, CRUCIBLE STEEL CO. OF AMERICA; and **Herman Meek**, becomes head, Combustion Engineering Dept.

**K. A. Allen**, appointed director of National Accounts, Quaker Rubber Corp., division of H. K. PORTER CO., INC., Philadelphia.

**K. G. Pound**, appointed sales administrative executive, PLYMOUTH MOTOR CORP., Detroit; and **F. G. Bischoff**, becomes director of distribution.

**Richard C. Martin**, appointed national sales director of KELITE PRODUCTS INC., Los Angeles headquarters.

**Carl F. Holland**, becomes sales engineer, Columbus Ohio office, HONAN-CRANE CORP.

**Walter F. Carter**, appointed assistant general superintendent, Riverdale, Ill. plant, ACME STEEL CO.

**Richard W. Lyke**, promoted to assistant plant engineer, Niagara plant, HOOKER ELECTROCHEMICAL CO.

**Thomas L. Kesler**, becomes geologist, FOOTE MINERAL CO., Philadelphia.

**Howard F. Weber**, appointed staff designer, SUNDBERG-FERAR, Royal Oak, Mich.

**Frank Warga**, promoted to general foundry foreman, AIRESEARCH MFG. CO., Los Angeles.

**John H. Stickney**, appointed sales engineer, Northern Indiana and Central East Illinois, PARKER APPLIANCE CO.

**Eugene J. Vineyard**, appointed export manager, ST. PAUL HYDRAULIC HOIST, Minneapolis.

**Warren Kinsey**, becomes manager of new plant, when built, CATERPILLAR TRACTOR CO., Peoria, Ill.

**Charles L. Garrettson**, appointed manager of industrial relations, AIR PRODUCTS, INC., Allentown, Pa.

**Fay Carlson**, named manager of Quality Control Dept., WARNER ELECTRIC BRAKE & CLUTCH CO., Beloit, Wis.



**GLENN B. DAVIS**, named president, Isthmian Steamship Co., subsidiary of U. S. Steel Corp.



**DARWYN I. BROWN**, becomes manager, Market Development, Koldflo Div., Mullins Mfg. Corp., Salem, Ohio. He was formerly with The Iron Age.



**J. M. LAMOND**, elected president, Pittsburgh Pipe & Coupling Co., Allison Park, Pa.

## Personnel

T. N. Thomas, elected manager of sales, JESSOP STEEL OF CANADA, LTD.

O. F. Marsal, becomes plant manager, LINCOLN-MERCURY DIV., Ford Motor Co., and H. H. Keays, becomes plant manager, Wayne, Mich.

R. G. Angell, appointed manager of railroad sales, A. M. BYERS CO., Pittsburgh.

R. L. Schutte, appointed sales manager, AHLBERG BEARING CO., Chicago; P. H. Staerk, named advertising manager; and J. E. Davis, becomes assistant treasurer.

R. M. Junker, appointed manager of newly combined Tank Lining and Industrial Roll Sales departments, Industrial Products Div., GOODYEAR TIRE & RUBBER CO.

William B. Beeson, Jr., named sales manager, BELLE ALKALI CO., a new subsidiary of Diamond Alkali Co.

Frank Gramm, appointed eastern regional sales manager, Welding Products Div., A. O. SMITH CORP.; Frank Row, named southern regional manager and J. P. Parker, named northern regional manager, Liquefied Gas Products Div.

Russell W. Higgins, appointed assistant sales manager, Spark Plug Div., THE ELECTRIC AUTO-LITE CO., Toledo.

Paul J. Dumas, appointed plant manager, New Orleans Plant, NATIONAL GYPSUM CO.

Henry McKeen, named sales manager, CAMPBELL, WYANT & CANNON FOUNDRY, Muskegon, Mich.

Richard D. Weinland, appointed general manager of purchases, CONTINENTAL CAN CO., New York.

William F. Goertz, becomes general sales manager, Axelson Mfg. Div., PRESSED STEEL CAR CO., INC., Los Angeles.



ARTHUR F. MURRAY, elected vice-president in charge of manufacturing, Electrolux Corp.



RALPH R. NEWQUIST, appointed president and general manager, Roots-Connersville Blower Div., Dresser Industries, Inc., Dallas.



W. O. COOK, named vice-president, Ideco Div., Dresser Industries, Inc.



DR. EDWARD M. REDDING, appointed director of research, Sharples Corp. Research Laboratories, Bridgeport, Pa.

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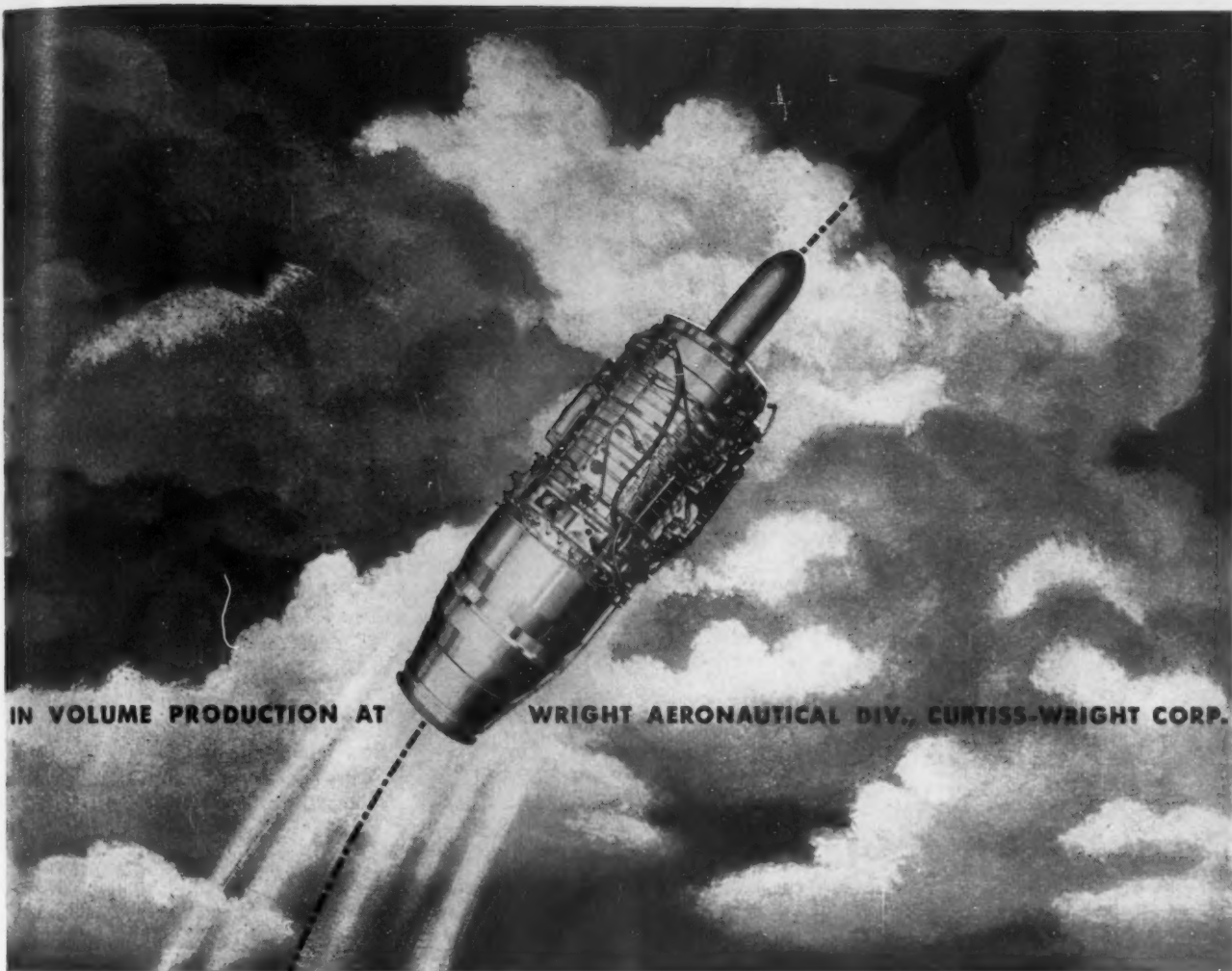
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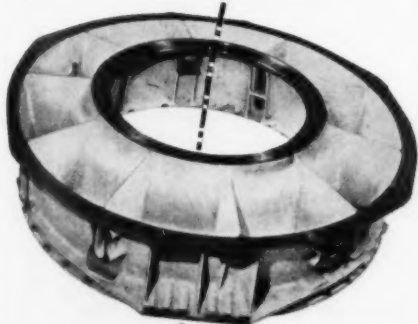
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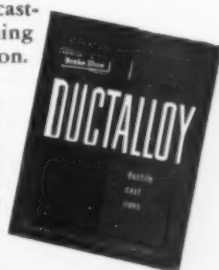
This highly stressed part secures the 7,200-lb. thrust Wright J-65 jet engine in the aircraft, carries major structural members ahead of and behind it, and mounts a main shaft bearing in its center. Air roars between the carefully contoured inner and outer rings.

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## Personnel

*Continued*

Charles T. McClure, promoted to assistant manager of oil country tubular sales, THE YOUNGSTOWN SHEET & TUBE CO., Youngstown, O.

H. M. Rittger, appointed general sales manager of tool steel products, Cincinnati, SOLAR STEEL CORP.; and Louis B. Weiskopf, named district sales manager, Chicago area.

Fred Duff, appointed district manager of operations in Chicago and surrounding areas, MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass.

J. S. Freese, promoted to assistant general production manager, Steel & Tube Div., THE TIMKEN ROLLER BEARING CO., Canton, O.

Herman Zeigler, promoted to general plant manager in charge of all operations, extrusion and fabricating plant, Detroit, WISCO ALUMINUM CORP.

Wallace T. Allin, appointed representative, Los Angeles, KENNA-METAL INC.; William W. Lind, named representative, Chicago; and Mark Rollinson, and Leonard Spicer, become representatives, Detroit.

## OBITUARIES

Edward P. Bullard, Jr., 80, a pioneer and leader in the machine tool industry for many years, retired president of The Bullard Co., Bridgeport, recently at his home in Fairfield, Conn.

Dr. Pierre I. Chandeysson, founder and president, Chandeysson Electric Co., St. Louis, recently.

Nathan L. Miller, 84, general counsel, U. S. Steel Corp., and former Governor of New York, recently.

Robert F. Holmes, 49, sales manager, Universal Engineering Sales Co., Frankenmuth, Mich., suddenly while on a sales trip to Kenosha, Wis., of coronary thrombosis.

Fred G. Owen, southern district manager, Koppers Co., recently in Birmingham.

James A. Long, formerly general manager, Woodward Iron Co., Birmingham, recently in Orlando, Fla.

Success story—

# GAS NITRIDED 4140

## Case Is Tougher



By J. G. Morrison  
Chief Metallurgist  
Landis Machine Co.  
Waynesboro, Pa.

◆ Precision machine parts made from 4140 steel have been successfully gas nitrided by Landis Machine Co. . . . That means lower production costs for those parts in which aluminum-bearing steels would be too brittle or too costly.

◆ Nitrided 4140 has a tougher case . . . Part shape becomes less critical . . . There's less need to round off corners . . . And there's less chance of grinding cracks where parts have to be ground after nitriding.

◆ Though 4140 has slightly greater "growth" than other nitriding steels, close dimensional control is possible with wet blasting, correctional grinding . . . The nitrided surfaces are nongalling and highly wear resistant.

◆ GAS NITRIDING of 4140 steel precision machine parts has been successfully applied by Landis Machine Co., Waynesboro, Pa. The method offers distinct cost advantages where, because of fragile part geometry, aluminum-bearing steels would prove too brittle, or, because of size involved, too costly. It has also been applied where the precision of the nitrided part is hard to obtain by other methods, even including grinding of the finished part.

Chief advantage of nitrided 4140 as compared to the aluminum-bearing steels is its tougher case. The geometry is less critical. Rounding of corners is not so necessary, female threaded holes need not be blocked off and, where superficial grinding after nitriding is necessary, there is less danger of grinding cracks. Gas nitrided 4140 finds application in those areas where the extremely hard Nitralloy steels are not too well adapted.

Precautions in processing 4140 steel to be nitrided are the same as for the Nitralloy

steels.\* The material must be in the quenched and drawn condition. Any decarburized surface must be removed. Stress relieving should be carried out before final sizing if precision or predictability of movement is essential. A nitrided 4140 part may be softened for remachining but renitriding is not successful unless the

\* V. O. Homerburg, "Nitriding," *Metals Handbook*, 1948.

original cased surface is removed. The nitrided surface resists softening under about 1000°F. Areas desired soft may be tinned or painted with a tin paint.

Growth of 4140 steel in gas nitriding is somewhat greater than in the Nitralloy steels at comparable times. However, with 24 and 48 hr nitriding periods the difference is negligible. The longer nitriding periods are avoided. Where a wear loss of 0.001 in. would limit the usefulness of the part, the relatively deep cases obtained by longer nitriding are not needed. Since part geometry affects directional growth

**A 48-hr nitride will produce a case of about 0.017 in., with high hardness to 0.005 in. . . .**

at least one part should be processed to determine what prenitriding compensation, if any, is required for maximum precision. Only in parts of symmetrical solid design can the growth of one size be reasonably translated to another similar but different size part.

Case depth after nitriding at 975°F for 24 hr will be about 0.012 in. The first 0.0015 in. is near maximum hardness and there is relatively good hardness to a depth of 0.003 in. The white layer will run between 0.0001 and 0.0002 in. A 48-hr nitride will produce a case about 0.017 in. deep with the maximum hardness layer about 0.003 in. and relatively high hardness to a depth of 0.005 in. The white layer will be about 0.0002 to 0.0004 in. Wet blasting with fine mesh grit after nitriding will remove most of the white layer. If corrective grinding is necessary after nitriding, removal of surface metal may not exceed 0.0005 in.

Comparative microfinish of heat-treated 4140 ground before nitriding, after nitriding and

after wet blasting with 325 mesh grit is shown in Table I.

The somewhat coarser finish after nitriding may be due to the variable and brittle white layer. Wet blasting showed a slight improvement in finish; a greater improvement may be achieved with a finer abrasive. However, the 325 mesh grit is satisfactory and finer grits would require longer blasting time.

Comparisons have been made with several steels regarding hardness obtainable by nitriding and the relative room temperature notched Izod impact values. All impact test specimens were finish ground to size before nitriding. After nitriding they were wet-blasted and tested. Nitriding was performed at 975°F with an average ammonia dissociation of 30 pct. Steels in each table were nitrided at the same time for corresponding periods.

Table II illustrates why annealed or normalized and drawn conditions are undesirable for gas nitriding. Notched Izod impact test values are extremely low and parts so processed would be too brittle for most applications. Low impact test values of the annealed and nitrided state are attributed to relatively low core strength and a more brittle case. Low impact values of the normalized and drawn material may be attributed to the relatively coarse grain and possibly a tendency to formation of a greater amount of nitride resulting in a brittle case. Surfaces of normalized and drawn 4140 and leaded Cr-Mo steels are significantly harder to Rockwell C and Superficial 15N than in the quenched and drawn condition, Table III, when nitrided, even though treated to the same approximate Brinell hardness before nitriding.

Table III shows the improvement in notched Izod impact test values when 4140 and the Cr-Mn-Mo leaded steels are quenched and tempered and then nitrided as compared to the

TABLE I  
**MICROFINISH OF 4140 COMPARED**

Sample	As-Ground Microinches	After Nitriding 975° F, 30 hr Microinches	After Wet Blasting 325 Mesh Grit Microinches
1	16	25	21
2	15	20	17
3	13	21	20

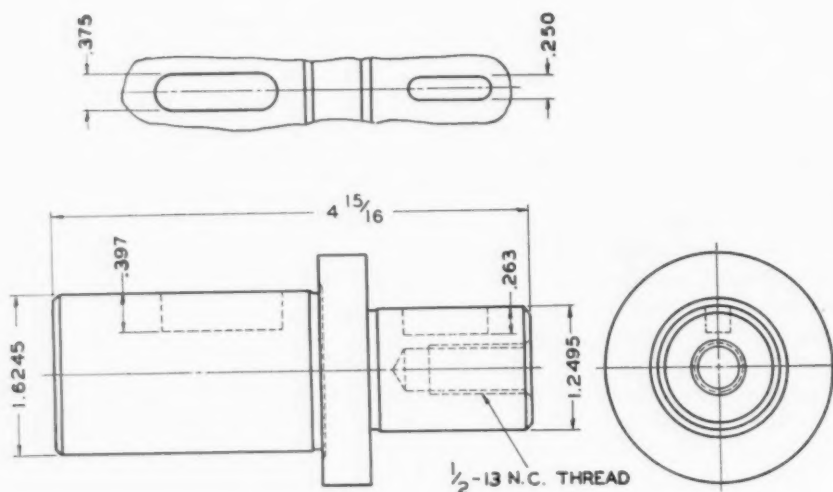


FIG. 1—Work arbor requires high resistance to wear. Keyway "growth" required some prenitriding compensation.



annealed or, normalized and tempered, and nitrided conditions.

Several experimental treatments subsequent to the nitriding of the impact test specimens are also given. To the flat surface of a No. 2 Nicholson XF file, using moderate pressure, the nitrided 4140 steel is file hard. Using a corner of the file and stronger pressure the surface is not file hard as the case is too thin to resist strong localized pressure.

When a nitrided surface is heated in a salt bath at 1125°F for 1 hr the surface is not file hard using the flat file surface and even moderate pressure. The Rockwell C hardness is lowered only one point but the Superficial 15N Rockwell is lowered a disproportionate two points. "Denitriding" the nitrided specimens by heating in a salt bath at 1500°F and tempering by an isothermal anneal in a salt bath at 1125°F yields a machinable "case" of RC 30 to 32. Rehardening the nitrided and annealed samples from a salt bath at 1525°F and tempering in a salt bath at 1125°F results in a "case" hardness of RC 41 and a core hardness of RC 29. Again there is a disproportionate decrease in the Superficial 15N hardness and surface is relatively soft to the flat of the test file. There is an apparent increase in case depth from 0.012 to 0.016 in. due to diffusion. Even the relatively high reheating temperatures have not broken down all the nitrides.

If a nitrided surface is annealed for remachining and the original case not removed, a reduction in surface hardness occurs after heating for quenching and tempering in salt baths, and renitriding. Some diffusion of the nitrides in situ may occur but formation of new nitrides appears to be inhibited.

Table V compares TS 4140 and a sulfurized 4150 steel treated to several hardness levels and nitrided at 975°F for 48 hr. The 4140 steel shows somewhat better Rockwell A values probably attributable to the adverse effect of the higher carbon content of 4150.

Table IV compares the surface hardness and notched Izod impact values of a sulfurized Cr-Mn-Mo and AISI 4140 steels nitrided for 15, 30 and 48 hr. Surface hardness of the Cr-Mn-Mo specimens are inferior to those of 4140. Impact values of the Cr-Mn-Mo steel are higher probably due to the lower case hardness. One series of each steel was treated to Bhn 302 before nitriding and another series

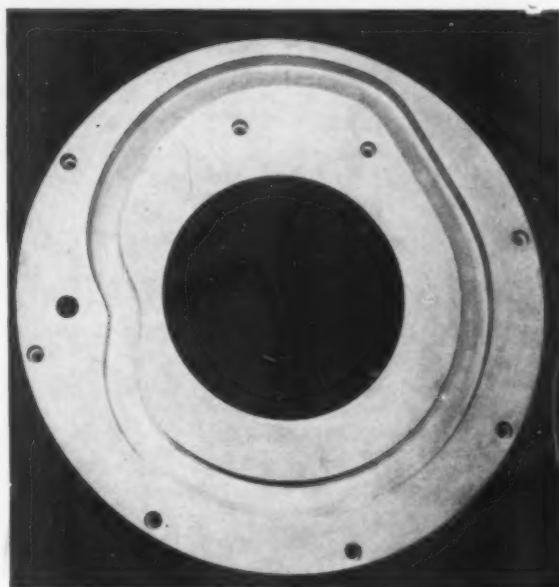


FIG. 3—Big 1 3/4 in. diam cams are heat treated to Bhn 270 to 300, finished to size. Only the camway is finish ground. Cams are gas nitrided 48 hr at 975°F.

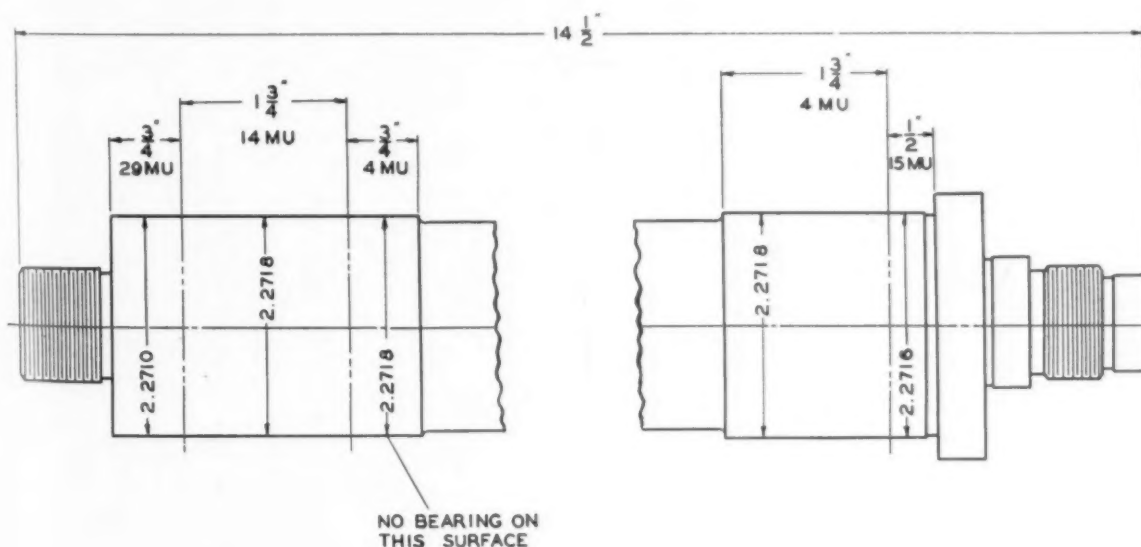


FIG. 2—Live headstock spindle, 4140 steel, was nitrided 48 hr. Grinding to true removed 0.0005 in. skin. Surface

finish after grinding was 1.5 microinches. Wear after 33 months' toolroom service was negligible.

# **Nitriding 30 or 48 hr makes little difference in impact values. . .**

was treated to Bhn 269. Impact values of the 4140 steel treated to Bhn 302 are lower than the material treated to Bhn 269. There is little difference in impact values of the 4140 steel

between the 30 and 48 hr nitriding periods. There is excellent agreement of the three impact specimens of 4140 tested for each condition. Impact values are sufficiently high to indicate adaptability to many machine parts.

Specimens of 4140 steel were treated at 1525°F, oil quenched and tempered to four different hardness levels. Specimens were

TABLE II

## **SURFACE HARDNESS AND IMPACT VALUES** **TS 4140 and a Cr-Mo Leaded Steel**

Specimen No.	Steel	Pre-treatment	Hardness Bhn	Nitriding 975°F, 24 hr	Hardness Rc	Surface Hardness 15N	Izod Impact ft lb
1	4140	As Received	172	None	.....	.....	33.5
2		Annealed		None	.....	.....	32.0
3				None	.....	.....	27.0
4	4140	As Received	172	Yes	25.9	84.5	1.0
5		Annealed		Yes	25.6	85.0	1.0
6				Yes	24.7	84.5	1.5
7	4140	Normalized 1650°F, Air	278	None	27.0	.....	10.0
8		Drawn 1050°F, 1½ hr		None	26.7	.....	8.0
9				None	26.4	.....	9.0
10	4140	Normalized 1650°F, Air	278	Yes	47.1	89.9	1.5
11		Drawn 1050°F, 1½ hr		Yes	47.0	90.0	2.0
12				Yes	46.0	89.4	1.5
13	Cr-Mo (leaded)	Normalized 1650°F, Air	300	None	.....	.....	3.0
14		Drawn 1150°F		None	.....	.....	3.0
15	Cr-Mo (leaded)	Normalized 1650°F, Air	300	Yes	49.3	90.8	1.0
16		Drawn 1150°F		Yes	49.1	91.0	1.0
17				Yes	49.2	91.0	1.0
18	Cr-Mo (leaded)	Normalized 1650°F, Air	286	Yes	48.5	90.5	1.0
19		Drawn 1200°F		Yes	48.5	90.5	1.0
				Yes	48.7	90.1	1.5

TABLE III

## **SURFACE HARDNESS AND IMPACT TEST VALUES** **Quenched and Drawn and Quenched Drawn and Nitrided**

Specimen No.	Steel	Pre-treatment	Hardness Bhn	Nitriding 975°F, 24 Hr	Re-treatment	Hardness Rc			Superficial Hardness 15N Case	Izod Impact ft lb
						As Treated	Core	Case		
21	4140	1520°F, Oil	290	None	None	30.0	.....	.....	.....	48.0
22		1125°F, 1 hr		None	None	30.2	.....	.....	.....	47.5
23				None	None	32.6	.....	.....	.....	50.5
24	4140	1520°F, Oil	290	Yes	None	.....	25.8	43.4	87.0	18.5
25		1125°F, 1 hr		Yes	None	.....	26.5	42.6	86.2	19.5
26				Yes	None	.....	26.3	44.3	87.3	28.5
27	4140	1520°F, Oil	290	Yes	Draw 1125°F	.....	25.5	42.0	84.4	24.0
28		1125°F, 1 hr		Yes	Salt Bath	.....	25.6	43.0	84.5	25.5
29				Yes		.....	25.6	41.8	84.2	24.0
30	4140	1520°F, Oil	290	Yes	"Denitrided"	.....	29.0	41.0	78.2	39.0
31		1125°F, 1 hr		Yes	Salt Bath	.....	29.0	41.1	79.5	39.5
32				Yes	1500°F, 20 min; 1125°F, 45 min Rehardened 1520°F, Oil 1125°F, 1 hr	.....	28.2	41.0	79.5	38.5
33	Cr-Mo (leaded)	1520°F, Oil	311	None	None	33.7	.....	.....	.....	57.5
34		1200°F, 1 hr		None	None	33.3	.....	.....	.....	62.5
35				None	None	33.5	.....	.....	.....	58.5
36	Cr-Mo	1520°F, Oil	311	Yes	None	.....	.....	44.8	87.0	28.0
37		1200°F, 1 hr		Yes	None	.....	.....	44.7	86.9	24.5
38				Yes	None	.....	.....	44.8	87.2	25.5
39	Cr-Mo	1520°F, Oil	269	None	None	28.5	.....	.....	.....	73.0
40		1250°F, 1 hr		None	None	28.5	.....	.....	.....	77.5
41				None	None	28.7	.....	.....	.....	76.5
42	Cr-Mo	1520°F, Oil	269	Yes	None	.....	.....	40.5	85.4	30.5
43		1250°F, 1 hr		Yes	None	.....	.....	40.6	85.4	30.5
44				Yes	None	.....	.....	40.7	85.4	30.5

Analysis of Steels Tested, Tables II and III:

Type	C	Mn	P	S	Si	Cr	Mo	Pb	Size Bar Treated in in.
TS 4140	0.43	0.96	0.017	0.019	0.30	1.10	0.14	.....	¾ sq
Cr-Mo (leaded)	0.46	0.74	0.015	0.035	0.31	1.06	0.50	0.22	1 sq

TABLE IV

# **SURFACE HARDNESS AND IMPACT TEST VALUES** **Nitrided Cr-Mn-Mo Sulfurized and AISI 4140 Steels**

Bar Stocks Treated to 302 Brinell

Cr-Mn-Mo Steel				Nitriding	AISI 4140 Steel			
Hardness Rc	Superficial Hardness		Izod Impact, ft lb		Hardness Rc	Superficial Hardness		Izod Impact, ft lb
	15N	45N				15N	45N	
33.0	77.8	38.0	35.5	None	32.2	78.5	38.0	52.0
33.0	78.2	38.2	37.0		33.1	78.8	38.5	55.5
33.1	78.0	38.1	77.0		32.9	79.5	38.5	55.0
41.4	88.2	54.2	57.0	15 hr	43.7	90.2	60.0	37.0
41.1	87.0	54.3	62.5		43.7	90.5	60.0	37.0
41.2	87.6	55.0	60.0		42.8	90.5	60.0	37.5
42.8	88.0	55.3	59.0	30 hr	46.7	90.6	61.0	31.5
43.3	88.0	55.1	30.5		46.7	90.2	61.6	33.0
43.5	88.0	55.2	22.0		46.3	90.2	61.0	32.5
44.7	87.8	57.2	26.0	48 hr	48.6	91.0	63.5	31.5
44.9	88.1	57.2	35.5		47.3	90.5	62.0	31.0
44.9	87.5	57.1	24.5		47.7	90.8	63.0	31.0

Bar stocks Treated to 269 Brinell

28.6	76.5	33.5	62.0	None	29.4	77.3	34.0	66.0
28.9	76.4	33.3	47.5		28.9	77.0	33.0	71.5
28.4	76.0	34.0	45.0		29.5	76.5	35.0	67.0
37.5	84.5	51.0	54.0	15 hr	40.5	89.0	57.0	43.5
37.9	85.5	51.0	58.5		40.1	89.5	57.0	42.0
38.2	86.0	51.0	63.5		41.1	89.2	58.0	40.5
39.0	86.0	54.5	66.5	30 hr	44.0	89.2	59.1	36.5
40.0	88.0	52.3	65.5		44.1	89.5	59.2	38.0
40.2	86.6	51.5	29.5		44.2	90.0	59.0	36.0
40.5	86.8	52.5	72.0	48 hr	44.4	90.1	59.8	37.5
40.7	86.3	52.6	52.5		44.8	90.3	60.1	36.5
40.8	86.8	53.0	36.5		45.1	90.1	60.5	38.5

Analysis of Steels Tested:

	C	Mn	P	S	Si	Cr	Mo
Cr-Mn-Mo	0.52	1.21	0.015	0.09	0.30	0.89	0.12
AISI 4140	0.42	0.82	0.014	0.014	0.32	1.01	0.20

TABLE V

## **SURFACE HARDNESS AND** **IMPACT TEST VALUES**

Nitrided and Treated to Various Hardness Levels

Specimen No.	Material	Hardness, Bhn Quenched and Drawn	Nitriding 975° F, 48 hr	Hardness		Izod Impact ft lb
				Rc	Ra	
18	4140	286	None	32.5	65.0	61
19			None	32.2	65.2	60
20			None	32.0	65.0	62
15	4140	286	Yes	44.0	74.7	34.5
16			Yes	44.3	74.6	35.5
17			Yes	44.0	74.7	36.0
26	4140	321	None	36.0	67.3	37.0
27			None	36.0	67.4	37.0
28			None	36.0	67.5	37.0
23	4140	321	Yes	47.6	76.7	19.5
24			Yes	47.6	76.9	22.5
25			Yes	47.5	76.6	17.0
11	Mod. 4150	277	None	31.0	64.5	61.0
12			None	31.3	64.6	49.0
13			None	31.2	64.5	66.5
7	Mod. 4150	277	Yes	40.0	71.4	41.0
8			Yes	40.2	71.2	23.5
9			Yes	39.7	71.1	30.5
3	Mod. 4150	321	None	36.0	67.3	51.0
5			None	35.8	67.0	44.0
6			None	36.2	67.2	32.0
1	Mod. 4150	321	Yes	47.0	75.5	23.5
2			Yes	47.0	75.6	27.5
4			Yes	46.8	76.0	24.5

Analysis of Steel Tested:

	C	Mn	P	S	Si	Cr	Mo
TS 4140	0.39	0.92	0.015	0.016	0.32	0.92	0.14
Mod. 4150	0.55	0.90	0.025	0.08	0.30	0.98	0.15

TABLE VI

## **MICROHARDNESS AT VARYING DEPTHS\***

Draw	1125° F	1150° F	1200° F	1300° F
Brinell, as treated	311	284	282	223
Rockwell C Nitrided surface	47.5	42.5	41.5	37.0
Rockwell A Nitrided surface	76.0	73.5	72.5	71.7
Indenter Loads				
Grams	Knoop Microhardness, Surface			
200	624	560	576	661
500	634	589	614	654
1000	613	592	600	632
2000	620	572	590	608
Knoop Hardness, 0.0005 in. below Surface				
200	749	699	695	751
500	693	596	634	654
1000	653	592	599	619
2000	623	583	574	593
Knoop Hardness, 0.001 in. below Surface				
200	644	628	587	628
500	642	600	584	614
1000	627	600	570	590
2000	629	581	562	572

\* AISI 4140, treated to four hardness levels and nitrided at 975° F for 30 hr.

TABLE VII

## **HOW NITRIDING, WET BLASTING** **Affect Dimensions, in inches**

	Large Diameter	Small Diameter	Wide Keyway	Narrow Keyway
Finish Dimensions	1.6245	1.2495	0.375	0.250
Tolerance	±0.0003	±0.0003	+0.0005 -0.001	+0.0005 -0.001
SIZES				
Before Nitriding	-1.6245	-1.2495	0.3763	-0.2502* -0.2505**
After Nitriding	-1.6250 1.6253	-1.2503 -1.2504	0.3746	-0.2496
After Wet Blasting	-1.6247 1.6248	-1.2497 1.2498	0.3751* 0.3750**	0.2497* 0.2499**

\* Bottom. \*\* Top.



## Gas-nitrided 4140 parts show high resistance to wear. . . . Parts treated include keyways, spindles and cams. . . .

ground and polished on one surface as for microscopic examination, then gas nitrided for 30 hr at 975°F. After nitriding the prepolished surface was again polished to a metallic luster with a minimum removal of surface metal. Knoop microhardness values were obtained under 200, 500, 1000 and 2000 g loads.

Microhardness readings were also obtained at 0.0005 and 0.001 in. below the surface. The Knoop numbers are recorded in Table VI. Specimens treated to Bhn 311 before nitriding show a generally higher pattern of hardness. The microhardness numbers obtained at the 0.0005-in. level below the surface are somewhat greater than the surface hardness using the 200 g load. Microhardness numbers in the near surface region are all comparable even though the Rockwell C and Rockwell A numbers differ appreciably.

Several examples of the successful application of gas nitrided 4140 steel are given below:

Fig. 1 is a work arbor requiring high resistance to wear. Two keyways must be held to close tolerance. Ordinarily in a steel treated to a high hardness and ground, the keyways would change size. Further, the keyways would be wider at the top. One keyway 0.250 in. wide on the small diameter changed very little, a tapped hole influencing the degrees of growth. The keyway on the large diameter "grew" smaller in width and required prenitriding compensation. As there is a slight tendency to a greater growth at corners such as the outer corners of the keyways, wet blasting tends to correct this by the more rapid abrasion. Dimensional changes are given in Table VII.

A live head stock spindle, Fig. 2, of a Universal grinding machine, 2¼ in. in diam x 14 in. long, was made of heat-treated 4140, ground to finish size and gas nitrided 48 hr. The spin-

dle showed a runout of 0.0003 in. after nitriding. It was ground true, and up to 0.0005 in. surface metal was removed. After grinding, surface finish was 1.5 microinches over the entire ground surface. The spindle was removed for inspection after 2 years and 9 months of high production toolroom service on the most precise work.

The amount of wear and the microfinish changes are indicated in the sketch. One area denoted "no bearing on this surface" was the original diameter of the ground surface. Originally 1.5 microinches finish, it showed 4 microinches when removed from the grinder, possibly due to some little scoring.

The spindle showed a wear loss of 0.0008 in. for ¾ in. at rear end and 0.0002 in. loss for ½ in. at front end. For 1¾ in. or most of the bearing surface at both rear and front ends there was no measurable wear loss but the microfinish was 14 and 4 microinches respectively. The spindle was returned to the machine. Considering the heavy demands on this grinder its condition was considered very good.

A cam 19¾ in. in diam by 1¼ in. thick containing a continuous camway 1.250 in. wide by ¾ in. deep is shown in Fig. 3. Cams are made of 4140 steel heat treated to Bhn 270 to 300 and finished to size with only the camway finish ground. Two holes which must be drilled later for assembly are blocked off with tin paint. Cams are gas nitrided for 48 hr at 975°F.

### ACKNOWLEDGMENT

Acknowledgment is made to the important contributions to the nitriding process made by Messrs. Harder, Gow and Wiley in their "Researches on Nitriding Steels," and to Mr. Horace Knerr for his successful application of gas nitriding to 4140 steel.

## NEW FILMS

"The Miller That Uses Its Head," is an educational film designed to show tool engineers some of the many applications of the hand miller for rise and fall spindle heads. Unlike many technical films, it is not a "how to operate" film. Rather, it presents an analysis of the hand miller from the tool engineer's and tool designer's point of view. It shows many kinds of tooling and fixture designs, from the simple stock fixture to completely automatic fixtures such as those required for planning a double-start helix on a fuel in-

jector plunger. Projection time is 23 minutes. Film is 16 mm, in sound and color. Free loan. Nichols-Morris Corp., 76 Mamaroneck Ave., White Plains, N. Y.

"Hold Everything," is a new 16 mm sound movie released by the Allen Mfg. Co. The film, in color, tells the story of the Allen Socket Screws. The film describes important differences between this and other types of fasteners. The film is primarily designed for sales training. Allen Mfg. Co., 10 Allyn St., Hartford 3, Conn.

# HOW COLLOIDAL GRAPHITE Protects Bearing Surfaces



By Howard Warburton

Technical Representative

Magnolia Anti-Friction Metal Co. of Great Britain, Ltd.  
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♦ Severe lubrication requirements demand inclusion of additives in oils and greases to maintain film strength . . . One of the best additives is colloidal graphite . . . It will function as a lubricant well above the boiling point of oil.

♦ Graphite films can withstand temperatures up to 600°C in a normal oxidizing atmosphere . . . Colloidal graphite is readily absorbed by most metals . . . It is applicable in a dry solid lubricant as well as in water, oil or alcohol.

♦ EXACTING LUBRICATION requirements of industrial equipment sometimes requires the inclusion of additives in oils and greases to avoid rupture of the lubricating film. One of the most satisfactory additives used in water, oil, mineral spirits and alcohol is colloidal graphite. It also has many "dry" lubricating uses.

A dry oil is not a good lubricant. Moisture must be present in the oil or on the surface to be lubricated. Freshly exposed, smooth metal surfaces have less affinity for a lubricant than those that are oxidized. Even using lubricant the coefficient of friction of a freshly prepared surface is greater than an oxidized one.

Highly refined mineral oils require the inclusion of additives to maintain constant viscosity for very heavy work. Cold forming involving high temperatures and pressures, and severe drawing and machining operations subject to metallic pickup, require further treating of lubricating oils.

These factors are reduced by the use of extreme pressure lubricants containing additives such as colloidal graphite, molybdenum disulphide or boron nitride dispersions with amyl acetate or another equally volatile carrier. Molybdenum disulphide is unsuitable for use in lubricating oils. Its application is limited to special line base or other greases.

Fatty acid compounds are added to oil to prevent dryness and form fatty metallic soaps with excellent lubricating and adhering characteristics. High pressure oils and greases contain a constituent which is readily absorbed by the metal surface. When the main body of the oil has either been scraped or squeezed off, the absorbed portion will cling to the surface and provide boundary lubrication for a longer period. Additives such as lime, sulphur, talc and graphite are usually to be found in greases.

At bearing pressures which do not respond to fluid lubrication, or even to boundary oil films, a new set of conditions is encountered.

**Colloidal graphite forms a very thin film on bearing surfaces, yet does not build up . . .**

Boundary lubrication which occurs in deep pressing or severe drawing and machining operations can successfully function only insofar as its properties are maintained at the high temperatures developed between the work and the die or tool. Under these conditions compounds containing sulphur, chlorine or other active ingredients are used to advantage.

There are some operations where an oil or grease lubricant is undesirable. In such cases effective lubrication may be obtained by the formation of a dry graphite film by means of one of the several colloids. A dispersion of colloidal graphite in water has been successfully used for the extrusion of aluminum alloys.

In drawing wire for electric lamps an adherent dry film of graphite is especially suitable. In die-casting a very thin adherent film of colloidal graphite on the die face provides lubrication and assists separation. At high temperatures, oil and grease lubricants oxidize. This causes carbon deposits in the bearing causing frequent cleaning and overhauling. A dry graphite film doesn't have this disadvantage and is more suitable in certain cases.

**Eliminate "creeping" of lubricant**

Colloidal graphite in solvents having predetermined boiling points may be used on a variety of equipment, such as lightly loaded mechanisms, plunger switches on telephones, food handling conveyor chains, etc. On machines used for manufacturing tobacco, mixing foods or powders, printing and producing textiles, oil must not contaminate the product. This can be avoided by using porous metal bushings which have absorbed a dispersion such as colloidal graphite in water, mineral spirits or alcohol. Bearings so treated absorb a sufficient quantity of lubricant to permit the spindle to operate freely for very long periods without visible traces of excess lubricant on the bearing surface. This eliminates the possibility of lubricant creeping along the shaft or being forced out and contaminating the product.

A clear distinction exists between colloidal graphite and ordinary graphite. Flake graphite is a natural product. It is not pure graphite, but has many valuable industrial applications. Colloidal graphite, however, is an electric furnace product with a high degree of purity and free from mineral matter.

Objections to the use of graphite often result from failure to distinguish between the ordi-

nary flake or powder graphite and colloidal graphite. This probably accounts for the criticism of the use of graphite in ball bearings. Using natural graphite it is possible to get a buildup on the balls and race because of the tight clearance, and sticking inevitably follows. Colloidal graphite does not build up. It can form an extremely thin film, but cannot increase the diameter of the ball, nor can it constrict the race.

Application of colloidal graphite to fine thread cutting with dies on aluminum alloys prevents stripping and is helpful in difficult press work. Retention of the graphite film on the surface may be proved by directing a beam of light on it. In the case of an ordinary polished surface the reflection is accompanied by a certain amount of diffusion. A graphited surface gives no reflection.

**Improves lubricating oils**

Although graphite in the dry state can be ground very fine in a colloidal mill, rendering it suitable for a colloidal solution requires the addition of stearic acid or some other medium in final grinding to avoid coagulation. The colloidal state attained is determined by the size of the dispersed particles. A typical example of a colloidal solution is milk, which consists of innumerable tiny, but microscopically visible droplets of fat floating in a watery liquid.

The excellent anti-friction properties of lubricating oils containing colloidal graphite have been shown in practical tests under abnormal conditions. In one case, a bearing lined with white metal, in which a steel shaft rotated at 260 fpm under a load of 230 psi, seized 35 min after the oil supply had been cut off. A steel shaft in an identical bearing, lubricated with graphited oil ran for 24 hr. This difference is accounted for by the thin layer of graphite adhering to the surface of the steel shaft. Unless the rubbing surfaces are kept apart by an unbroken film of lubricant, they are bound to rub harshly against each other. Where a bearing has been lubricated with a colloidal graphited oil the surfaces maintain a certain amount of oiliness and run together more smoothly.

Colloidal graphite will function as a lubricant at well above the burning point of oil since it is resistant to heat as high as any mechanical equipment is likely to operate. A graphite film can withstand a temperature of 600°C in a normal oxidizing atmosphere and above 1,000°C in non-oxidizing atmospheres from which air is partially excluded. It permits lubrication under conditions where a continuous oil-feed system cannot operate. Another advantage of colloidal graphite is its ability to form a film of required thickness at a needed area.



# How to Reduce Failures IN HIGH TEMPERATURE ALLOYS



By W. E. Jones  
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♦ Failure problems increase as metals are used at higher temperatures . . . High temperature applications demand better performance although the materials become weaker . . . To solve these problems the nature of high temperature failures must be recognized.

♦ Metals differ widely but the failures that occur are similar . . . Stress rupture failure can be accelerated by cyclic temperature conditions . . . Molybdenum offers great promise as a higher temperature alloy if the oxidation problem can be solved.

♦ HIGH TEMPERATURE failures present difficult problems to the designer and metallurgist. As the temperatures at which these metals are used increase, the metals themselves become weaker. Yet in high temperature applications the performance required of these materials becomes more severe and demanding. Development of good high temperature alloys has progressed rapidly in recent years, particularly for jet engine applications. Even higher temperature alloys will be required in the future. The nature of high temperature failures must be recognized if they are to be overcome and better high temperature materials developed.

High temperatures are sometimes thought of as anything above 1000 or 1200°F. However, between room temperature and 2000°F there are metals that act in a high temperature manner in almost any portion of this range. These metals differ widely in composition, microstructure, response to heat treatment, physical prop-

erties and other individual characteristics. Nevertheless, the problems that exist and the failures that occur are similar in nature. They have a direct correlation if the conditions of stress, temperature, time, etc., are modified.

In designing a part to operate at relatively low temperatures, the prime considerations are the tensile and yield strengths, ductility, impact strength, and other mechanical properties. The yield strength is the governing factor if plastic flow cannot be tolerated. As the temperature increases to intermediate values, the creep strength becomes the governing factor since materials at 900 to 1000°F will exhibit plastic flow at stresses considerably less than the yield strength. Where minimum amounts of plastic flow are required, yield strength or creep strength, depending on the temperature and the time, become the limiting factors in design.

There are many parts in which a reasonable amount of plastic flow must be tolerated because

**Cutting and grinding will produce severely cold-worked layers 0.001 to 0.002 in. deep . . .**

of the stresses and times involved. Under these conditions the stress rupture becomes the limiting feature. The shift from low temperature to high temperature failure takes place where the rupture strength begins to deviate from the tensile strength, see Fig. 1. This is not a clearly defined point since it is affected by strain rate, time, composition, cold work, etc. There is a change from transgranular failures in which slip takes place within the grains to intergranular in which grains rotate or there is submicroscopic slip and the failure is at the grain boundary.

Failures due to stress rupture can be observed in buckets, wheels, and many other high temperature components. A typical jet engine bucket which failed by stress rupture can be seen in Fig. 2. This failure occurred in the edge of the bucket at the point of the maximum combination of stress and temperature. The location of a failure will vary with bucket design. They are all intergranular and produce numerous cracks. The tendency to stress rupture failure can be accelerated by cyclic temperature conditions and by occasional hot starts with instantaneous but extremely high temperatures. Many small cycles or a very few large cycles do not seriously reduce the steady state stress rupture strength.

Cold working can have an appreciable effect on the rupture strength. This same effect is observed in rupture tests at temperatures below which recrystallization can occur. The resulting rupture curve is steeper than a similar curve for an annealed material, so there will be a

STRESS VS TEMPERATURE  
FOR SEVERAL TYPES OF TESTS

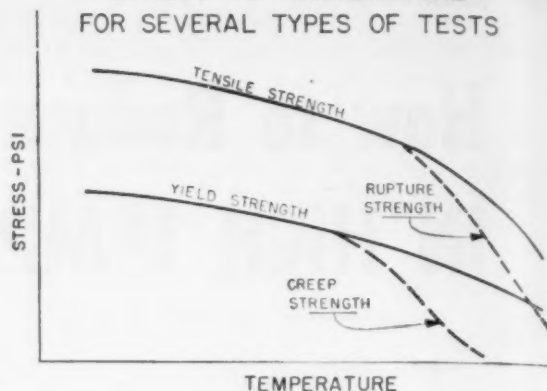
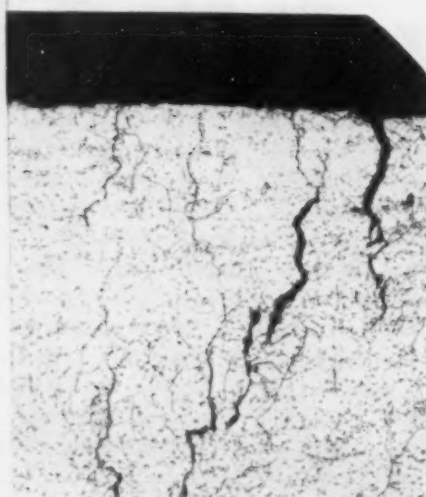


FIG. 1—High temperature failures occur where the rupture strength deviates from the tensile strength.

point at which the cold worked material will be inferior. For materials used in jet engine wheels at about 1200°F there is an improvement in strength by cold working and most wheels are processed in this manner.

Jet engine buckets offer an interesting example of the effects of cold work on metals at elevated temperatures. The base of the bucket can be strengthened by shot peening. The blade portion, however, may be above the recrystallization temperature so every effort has to be made to protect it from any cold work. This is particularly true of the nickel-base alloys which recrystallize at slightly lower temperatures than the usual cobalt-base alloys. Cutting, grinding and polishing will produce severely cold worked layers 0.001 to 0.002 in. deep on the surface of the part. This layer represents a sizeable percentage of the cross sectional area of the edges of the bucket where rupture failures begin. If the temperature of this area is high enough during engine operation for recrystallization to take place, this layer should be weak and more cracks

FIG. 2—Stress rupture failure took place in edge of bucket, arrow. At left is photomicrograph of failed area.



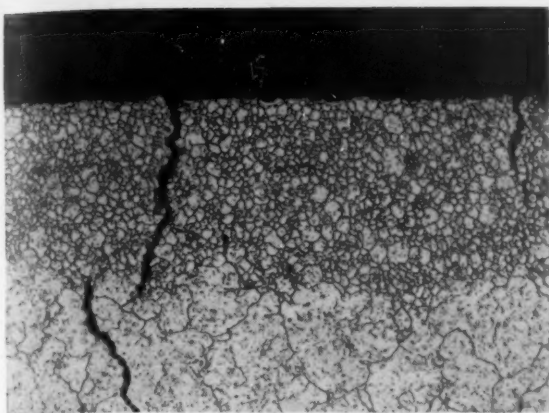


FIG. 3—Recrystallized layer on edge of turbine bucket. Layer should be removed by electrolytic polishing.

should start. Fig. 3 shows the recrystallized layer on a bucket after engine operation. To reduce this tendency jet engine buckets of nickel-base alloys should receive an electrolytic polish as the final operation which removes this cold worked material.

Fatigue strength is another factor in the high temperature performance of metals because of the possibility of resonant vibration. Under conditions of resonance large stresses can be developed with small amounts of energy. This can occur in jet engine buckets and many other parts which have frequencies that match the exciting forces in the engine. The exciting forces in a jet engine result from fixed numbers of combustion chambers, diaphragm blades, and turbine buckets rotating in the gas stream. Fig. 4 shows a turbine bucket that has failed on the tip by fatigue. This failure started some distance away from the tip, as can be seen in the second portion of the figure which shows the crack broken open. The location of such a failure depends upon the design of the part and its re-

sultant vibratory patterns. These failures, up to extremely high temperatures, will be of the low temperature, transgranular type because of the high strain rates.

The nature of the residual stress patterns in the surface can greatly influence the fatigue strength. If the surface contains high residual tensile stresses which can result from improper grinding, the fatigue strength will be lowered because the residual stress and the induced stress become additive. Residual compressive stresses will increase the fatigue strength, because in this case the induced stress has to overcome the residual compressive stresses before failure can occur.

Fatigue strength is lowered by increasing temperatures, see Fig. 5. The temperature also relieves the residual stresses, so that an actual increase in fatigue strength may be observed in the tensile stressed specimen as the temperature is increased. This value will approach that of the unstressed bar as the stress relief becomes more complete. The specimen which has been cold worked to put in residual compressive stresses for improved fatigue strength at low temperatures suffers from this same stress relief and also approaches the unstressed value. If the testing temperature is further increased to the point that recrystallization can occur during the test, then the cold worked material will be inferior.

In service a part is usually subjected to static and alternating loads at the same time. These combined stresses reduce the load carrying capacity from the values obtained when the rupture or fatigue strengths are measured individually. With existing and unpredictable vibration problems it is necessary to know the nature of these combined stresses. If the ratio of alternating stress to static stress is high, wrought materials which generally have higher



FIG. 4—Turbine bucket failed by fatigue. Crack is opened to show progressive nature of failure.



**In jet engine buckets the ratio of vibratory to static stress is large . . .  
Wrought materials have advantages . . .**

fatigue strength than cast materials, can be used advantageously. If the ratio is low, castings can be used to advantage since they possess higher rupture strength in the high temperature region. Jet engine buckets which are large, and turbosupercharger buckets which are small, offer an example of this difference. In jet engine buckets the ratio of the vibratory to static stresses are large and experience has shown the advantage of using wrought materials. Turbosupercharger buckets provide an excellent application for castings because of their lower ratio of vibratory stresses.

Some parts of the pet engine, notably the diaphragm blades and turbine buckets, are subject to considerable thermal shock. This is due to rapid heating and cooling of a localized area and in itself can produce failure. Thermal shock implies high thermal gradients and resulting high stresses which cause the failure. The stationary diaphragm blade is the best example of

the action of thermal shock and high thermal stresses. This part is usually a casting to take advantage of the high strength to resist the buckling action of the thermal stresses. It is subject to a more or less continuous thermal shocking which tends to upset the edge when hot, putting it into compression. As the blade cools off and contracts, the stress is reversed to one of tension. Repeated cycles will produce failure which bear a great deal of similarity to fatigue failures. In both cases, the failures are transgranular, wrought materials are better than cast materials and fine grain size is better than coarse grain size. Fig. 6 shows a typical diaphragm blade failure along with the microstructure of the crack.

The effect of notches on high temperature failures is important because notches greatly affect strength properties and parts cannot be manufactured which are free of them. Some materials seem to be always notch sensitive which pretty much eliminates their application, while others are always notch ductile. Between these extremes are materials which may be either way depending upon processing variables, stress, temperature and dimensional variables. Fig. 7 shows the microstructure of two samples of Timken 16-25-6 which exhibit the differences that can exist. The one with carbide networks at the grain boundaries is notch brittle, while the second is notch ductile.

Notches also have a large effect upon the high temperature fatigue strength. Fatigue failures are brittle failures and the notched bar strength will never exceed the smooth bar strength since the small amount of plastic deformation which occurs in fatigue failure is not sufficient to reduce the stress concentration. There is, however, a decided difference in the notched fatigue

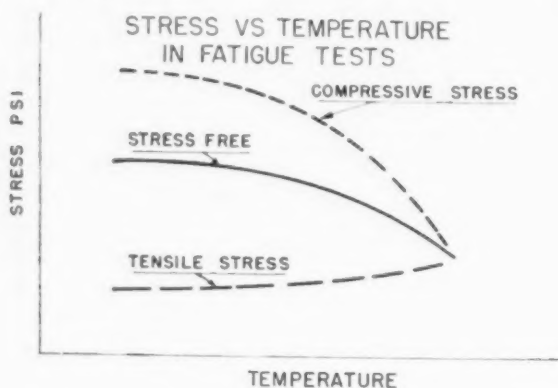
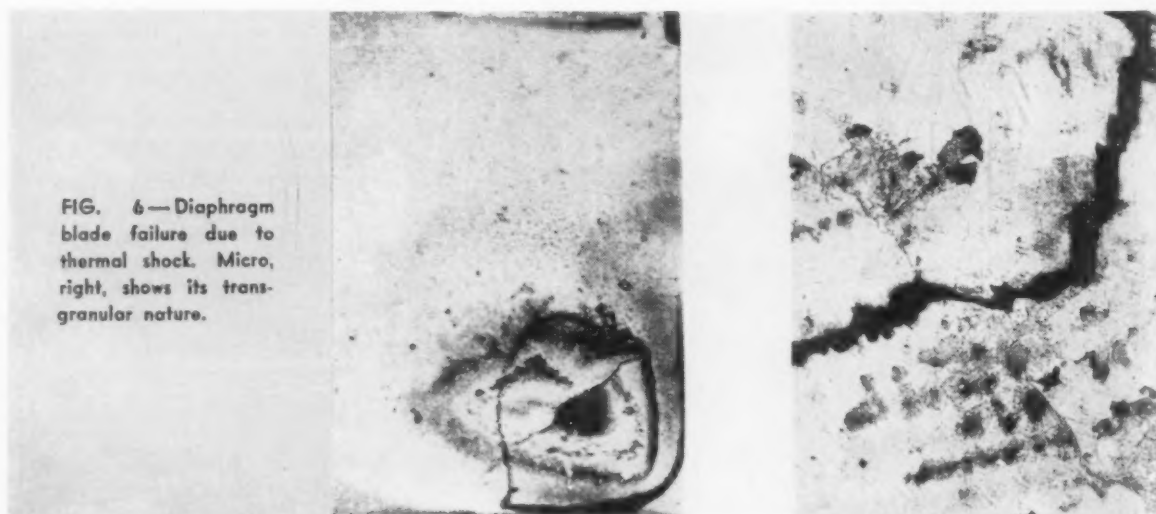


FIG. 5—Fatigue strength is lowered as temperature increases. Residual stresses are also relieved.



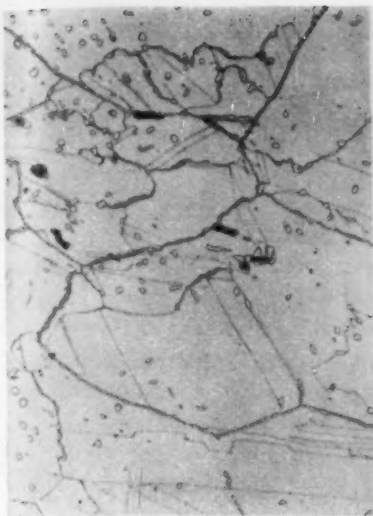


FIG. 7—Microstructures of 16-25-6 samples show distribution of carbide phase which affects notch rupture properties. Left is notch brittle, right notch ductile.

strength of ductile and brittle materials. Extremely brittle material has a strength reduction factor roughly equivalent to the stress concentration factor. Ductile material, with its ability to flow plastically to a limited extent, will not have as severe a reduction in strength, but it will never equal a smooth bar strength.

Oxidation resistance has not been a serious problem in the past. If a particular material was found lacking in this quality, a change could always be made to the stainless or heat resisting alloys. It will become more of a problem in

the future, particularly if molybdenum or molybdenum-base alloys receive greater use. This material oxidizes very rapidly by forming a liquid phase  $\text{MoO}_3$  at about  $1375^\circ\text{F}$  which then vaporizes as a dense white smoke. The oxidation rate is extremely high in comparison with the regularly encountered alloys, thus requiring protective coatings. Due to the nature of the oxidation the coating must be completely continuous if oxidation is to be stopped. Considerable effort is being made to overcome this problem because molybdenum offers great promise as a higher temperature alloy.

## What do YOU know about labor unions?

Check your labor IQ with this "True-False" quiz—

1. Employees are more interested in what the union can do to get a general pay increase than in correcting wage inequities.

2. Among all union members the feeling that "Supervisors are no good" ranks high among reasons why they want to belong to a union.

3. Fear of strikes makes large numbers of employees afraid of unions.

4. Employees prefer unions that are strong at the national level, maintain tight control; they distrust autonomy at the local level.

5. A great many union members belong to the union only because they are in union shops.

6. Prevailing undemocratic methods in unions, the lack of free speech and free debate have aroused much criticism among union members.

7. Feeling that unions hold back good workers and protect the lazy is high on the list of union members' opinions of "What's wrong with unions."

8. The great majority of union members are pretty well satisfied with their local officers, feel that they do an adequate job.

9. Among unionized employees, poor supervision is the No. 1 reason why employees have turned toward unions, but this is not quite so important a factor among non-union workers.

10. The need for better "human relations" among supervisors has been over-emphasized.

Answers on following page

1. T F	1. T F	1. T F	1. T F
2. T F	2. T F	2. T F	2. T F
3. T F	3. T F	3. T F	3. T F
4. T F	4. T F	4. T F	4. T F
5. T F	5. T F	5. T F	5. T F
6. T F	6. T F	6. T F	6. T F
7. T F	7. T F	7. T F	7. T F
8. T F	8. T F	8. T F	8. T F
9. T F	9. T F	9. T F	9. T F
10. T F	10. T F	10. T F	10. T F

# What do YOU know about labor unions?

First—in case you missed them—look at the questions on the previous page.  
Here are the answers and the reasons behind the answers.

1. FALSE. Employees rate correction of wage inequities above across-the-board wage increases as a reason for wanting to belong to a union. The union gets a good deal of credit when an across-the-board wage increase is negotiated, but most employees now recognize that the company should get at least a part of the credit.

Wage inequities are a different matter. The employee compares his own wages with what he thinks other people earn in his own plant, doing much the same kind of job he's doing.

If he concludes that someone else is getting paid more for the same kind of work than he is, a wage inequity has developed. The fact is that the system for establishing wage rates is usually a mystery to employees.

2. TRUE. While the number one reason for membership is "Helps me get more money," and security ranks second, "poor supervisors" rank third in importance, followed by the conviction that union membership provides the best way to settle grievances. Reluctant union members consider the supervisor problem even more important than most. (See table at right.)

3. TRUE. Taking into account all shades of union membership, the fear that union membership ultimately means strikes is the dominant reason why many employees are not strong for unions. One out of every four lukewarm union members expressed fear of strikes, as did 14 pct of the reluctant members.

4. FALSE. Like many others, union members resent and distrust regimentation—whether by management or by union. About half of those interviewed were employees in unions where policy from the international president's office dominates the local. The other half were members of unions with varying degrees of autonomy and freedom at the local level. Almost to a man, members of the latter type unions are in favor of the autonomous structure under which their union operates. Considerably more than a majority of members of the more autocratic unions have the same opinion.

5. FALSE. Only about 2 pct of the employees interviewed gave the fact that they are in a union shop as their reason for membership.

Most would belong anyway for other reasons: Money, job security, poor supervisors, grievance handling, etc. (See table.)

6. TRUE. Most union members agree that a good union operates democratically. This thought was expressed by ardent unionists as well as by lukewarm members. Many resent the internal struggles for power in the locals. The basic constituents of a good union from members' standpoint bear an amazing resemblance to what stockholders might consider the basic requirements for a good corporation.

7. FALSE. Although 5 pct of those interviewed expressed the opinion that unions hold back good workers and protect the lazy, there are five other "gripes" which outrank it.

8. FALSE. Some 29 pct of all unionists interviewed feel that their local officers and stewards are ineffective. Other factors under "What's wrong with unions" are: "Don't get results for members" (22 pct); "Union is strike-happy" (21 pct); "Too much local politics" (9 pct); "Too dominated by the international" (6 pct); "Local officers unqualified" (5 pct).

9. TRUE. Some 21 pct of unionized employees interviewed gave this as the principal company policy influencing employees toward joining unions. Only 13 pct of non-union workers gave this as their idea of the principal reason but 33 pct of these non-union men gave inequities in wage structure and low wages as the main reason. The latter reason was cited by only 17 pct of union members. (See table at right.)

10. TRUE. Frank discussions with workers provoked few complaints about cruel or discriminatory treatment, lack of sensitivity, or the other attributes which many human relations experts say are so important. Most employees prefer a supervisor who is a strict disciplinarian to one who is wishy-washy. The unsatisfactory foreman is much more likely to be a man who doesn't know how the union contract is interpreted by top management, who is not kept up to date by the front office on changes in company policies and procedures, or who is not invariably backed up by management.

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The material on these pages is based on the survey report, "Men and Unions," by John G. Mapes, president, Group Attitudes Corp., New York.

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Some little known facts—and some popular misconceptions—about employee opinions are disclosed in a recent survey by Group Attitudes Corp. It is based on interviews with nearly 2000 hourly workers in industry in 15 cities located in eight eastern and midwestern states. Ninety pct of those interviewed belong to unions—AFL, CIO and UMW affiliates.

### "Why I want to belong to a union"

	Ardent Union Members	Lukewarm Union Members	Reluctant Union Members	All Union Members
Helps me get more money	17%	18%	21%	18%
Gives me more security	16	15	5	14
Supervisors are no good	12	9	23	13
Best way to settle grievances	13	12	10	12
Stands my side against the company	12	10	9	11
It is a lousy place to work	12	11	7	11
Get better or safer working conditions	11	10	4	10
Workers should stick together	7	12	11	9
There's a union shop here	0	3	10	2

### "Here's what's wrong with unions"

	Ardent Union Members	Lukewarm Union Members	Reluctant Union Members	All Union Members
Local officers and stewards ineffective	28%	30%	30%	29%
Doesn't get results for members	29	22	15	22
Strike-happy	18	24	20	21
Too much local politics	12	9	6	9
Too dominated by the International	4	4	10	6
Local officers unqualified	6	4	6	5
Holds back good workers, protects lazy workers	*	5	9	5
Miscellaneous reasons	3	2	4	3

\*Less than 1%

### "Why I don't need a union"

	Non-Union Members	Union Members			
		Ardent	Lukewarm	Reluctant	All Union Members
Don't need a union to get along	13%	*	14%	32%	23%
Unions mean strikes	18	*	24	14	19
Good company, good bosses, good job	15	*	15	12	14
Haven't any gripes that I can't handle myself	17	*	15	11	12
Don't trust the men who run unions	6	*	10	8	9
Unions keep you from getting ahead	5	*	13	4	8
My pay here is always OK	12	*	*	14	8
The company treats you like a human being	14	*	9	5	7

\*Less than 1%

### Why employees turn toward unions

	Non-union Employees	Unionized Employees
Poor supervision	13%	21%
Inequities in wage structure; low wages	33	17
Inadequate communications with employees	10	15
Lack of a fair system of seniority	15	8
No pension plan	1	8
General distrust of management	5	7
Unsteady work	1	6
Poor working conditions	8	5
Inadequate safety program	7	5
Management shows no interest in employees	*	3
Management does not keep promises	*	3
Grievances poorly handled	7	2

\*Less than 1%

Know the angles—

# How to Make SURE YOUR SLINGS ARE SAFE

B. R. Craig  
Sling Engineer  
A. Leschen & Sons Rope Co.  
St. Louis

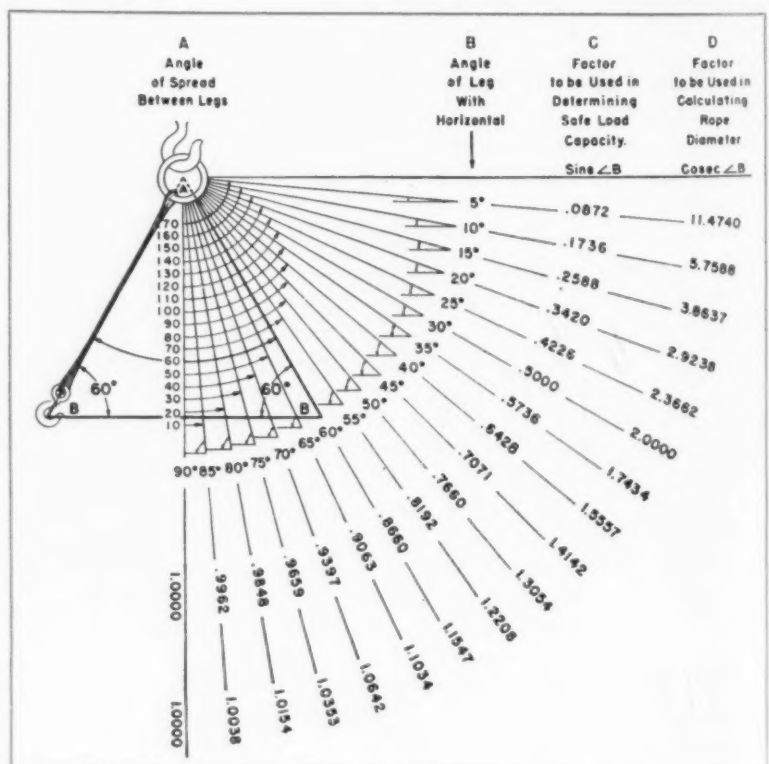
♦ Tested and proven rated capacities and design factors to insure safe wire rope slings cover all types of sling use . . . If properly applied, these data guarantee safe conditions at minimum expenditure of time and equipment . . . Typical problems are solved to familiarize operators on how to quickly use the published data.

♦ SAFETY is the first essential, so wire rope slings of sufficient strength must be selected. Where two or more legs are involved, first consideration must be given to the important fact that the stress in a sling varies with the angle at which the legs are used.

It is usually assumed that the loads are approximately symmetrical and in balance, and that the legs are of equal length. If a sling is to be calculated for an unbalanced load—where one leg will handle a greater weight than the other—this must be clearly indicated, and a sketch should be submitted to the supplier showing the location of the center of gravity. If the legs are to be vertical, the full safe working load of the sum of the two ropes is available. When the legs are spread at an angle, the allowable safe working load

will decrease as the included angle increases.

In Table I, safe loads for bridle slings are shown with both legs vertical. These are usually attached to a spreader bar and used to lift



USE THIS CHART, right, to determine safe load capacity of a sling or to find the proper rope for a given load.

locomotive or car bodies. The typical bridle sling is seldom used with both legs vertical. They are generally spread apart as shown.

### How to Calculate Safe Loads on Slings

For a sling of given rope diameter, the safe working load at 60°, 90° and 120° would be calculated by using the percentages, as shown in Fig. 1; or for any angle by reference to the chart on the previous page. The degree of spread may be designed either by the included angle at the hook, or by the angles made by the legs with a horizontal plane.

In the case of a sling with equal length legs, spread at an angle of 60° at the top, the legs would also make an angle of 60° with the horizontal. If the angle at the top were 90°, the legs would make an angle of 45° with the horizontal. The relationship is based on the law that the sum of the interior angles of a triangle is 180°.

### How to Calculate Diameter of Rope Required

To determine the diameter of rope to be used for given conditions, the stress in each leg of a two-legged sling is taken as equal to half the load divided by the sine of the angle at which the leg is inclined to the horizontal. The tension in the rope increases as the angle with the horizontal decreases. Fig. 1 demonstrates how tension increases as the sling angle flattens.

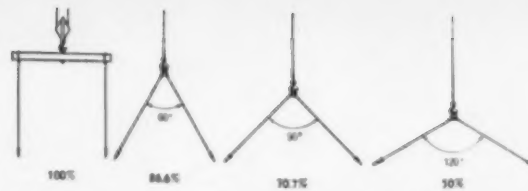


FIG. 1 The safe working load of a bridle sling decreases as the angle of the leg spread increases.

The chart on the previous page may be used in determining the safe load capacity of a given sling or in calculating the proper rope to use for a given load. The sloping lines correspond to the legs of the sling taken at intervals of 5°. They may be used as shown by the diagram in the upper left-hand corner to determine the angles formed by the legs at the ring or link, and with a horizontal plane.

To illustrate this, a triangle is shown in heavy lines, one side of which is detailed as the leg of a sling. The legs form the 60° angle "A" at the top, and two 60° angles "B" at the bottom, between the legs and a horizontal plane.

The angle of spread (at ring or link) is shown in the vertical column A. The figures shown under B are the angles between the legs and a horizontal plane and are the ones used in the calculations. Under C are the factors to be used in determining the safe load capacities

TABLE I

## SAFE LOADS STANDARD SINGLE WIRE ROPE SLINGS

Rope Diameter in Inches	In Tons of 2000 Pounds								
	Two Legs			Three Legs			Four Legs		
	Vert.	60°	45°	Vert.	60°	45°	Vert.	60°	45°
6x19 Fiber Core									
3/8	1.8	1.5	1.2	2.7	2.3	1.9	3.6	3.1	2.5
1/2	3	2.6	2.1	4.5	3.9	3.2	6	5.2	4.2
5/8	4.6	4	3.2	6.9	5.9	4.8	9.2	7.9	6.5
3/4	6.8	5.9	4.8	10.2	8.8	7.2	13.6	11.8	9.6
7/8	9.2	7.9	6.5	13.8	11.9	9.7	18.4	15.9	13
1	12	10.4	8.5	18	15.6	12.7	24	20.8	16.9
1 1/4	15	13	10.6	22.5	19.5	15.9	30	26	21.2
6x37 Fiber Core									
1 1/4	17.4	15	12.3	26.1	22.6	18.4	34.8	30.2	24.6
1 3/4	21.2	18.3	15	31.8	27.5	22.4	42.4	36.7	30
1 1/2	25.2	21.8	17.8	37.8	32.7	26.7	50.4	43.6	35.6
1 5/8	29.4	25.4	20.8	44.1	38.2	31.2	58.8	51	41.6
1 3/4	34	29.4	24	51	44.2	36	68	58.8	48
1 7/8	39	33.8	27.6	58.5	50.6	41.3	78	67.5	55.1
2	44.2	38.3	31.2	66.3	57.4	46.8	88.4	76.5	62.4

Note 1—The safe loads shown in this table provide a factor of safety—varying with the rope diameters—of from six to seven.

Note 2—The table above is based on an average diminishing splicing efficiency of from 95% to 75%.

Note 3—For slings with wire rope core add 7 1/2% to the safe loads of table above.








Rope Diameter in Inches	In Tons of 2000 Pounds				
	Vertical Hitch	Anchor Hitch	Basket Hitch		
			Position of Legs		
			 Vertical	 80°	 45°

TABLE II

## 6x19 Fiber Core

Rope Diameter in Inches	Vertical Hitch	Anchor Hitch	Basket Hitch Vertical	Basket Hitch 80°	Basket Hitch 45°
3/8	.9	.7	1.8	1.5	1.2
1/2	1.5	1.2	3	2.6	2.1
5/8	2.3	1.7	4.6	4	3.2
3/4	3.4	2.8	6.8	5.9	4.8
7/8	4.6	3.8	9.2	7.9	6.5
1	6	4.9	12	10.4	8.5
1 1/8	7.5	6.2	15	13	10.6

## 6x37 Fiber Core

Rope Diameter in Inches	Vertical Hitch	Anchor Hitch	Basket Hitch Vertical	Basket Hitch 80°	Basket Hitch 45°
1 1/4	8.7	7.2	17.4	15	12.3
1 1/2	10.6	8.7	21.2	18.3	15
1 3/4	12.6	10.4	25.2	21.8	17.8
1 7/8	14.7	12.1	29.4	25.4	20.8
2	17	14.1	34	29.4	24
2 1/8	19.5	16.1	39	33.8	27.6
2 1/4	22.1	18.3	44.2	38.3	31.2

Note 1—The safe loads shown in this table provide a factor of safety—varying with the rope diameters—of from six to seven.

Note 2—The table above is based on an average diminishing splicing efficiency of from 95% to 75%.

Note 3—For slings with wire rope core add 7 1/2% to the safe loads of table above.

## SAFE LOADS STANDARD WIRE ROPE BRIDLE SLINGS

and under D the factors used when calculating the diameters of the rope required.

What is the safe load that may be handled with a two-leg bridle sling made of 5/8-in. diam Hercules Red-Strand Wire Rope, where the conditions require that the legs be spread at an angle of 70°?

From the first-page chart it will be seen that if the angle of spread between legs is 70°, the angle (B) that each leg makes with the horizontal (when in balance) is 55°. A stress of 2.3 tons (Table II) could be safely applied to each leg, and 4.6 tons or 9200 lb total for the sling if used vertically. To determine the safe load at the required angle the figure 9200 is multiplied by the factor 0.8192 shown in the chart, column C, opposite the 55° horizontal angle.

Required safe load W, at given angle of spread = safe load for two vertical ropes x factor in column C = 9200 x 0.8192.  
7536 lb

What diameter rope must be used in a two-leg bridle sling to handle 10,000 lb when legs are spread at an angle of 80°?

As in the first example the chart will show that with the legs spread at an angle of 80° the horizontal angles would be 50° each. One half the load or 5000 lb must be carried by each leg. To calculate the tension developed in each leg by this vertical load of 5000 lb multiply the load by the factor in column D opposite the angle of 50°.

$$\begin{aligned} \text{Tension } T \text{ in one inclined leg} &= \frac{1}{2} \text{ total vertical load} \times \text{factor in column D} \\ &= 5000 \text{ lb} \times 1.3054 \\ &= 6527 \text{ lb} \end{aligned}$$

Applying a factor of 7, a rope with a breaking strength of 45,689 lb on 22.8 tons is required. This would indicate a 3/4-in. 6 x 19 Hercules Red-Strand Wire Rope. Or from the first column under safe load it will be seen that to handle 6,527 lb safely on a single leg, a 3/4-in. Hercules Red-Strand Wire Rope is needed.

## NEW BOOKS

"Introduction to Solid State Physics," by Charles Kittel provides an elementary account of the physics of solids. Emphasizes the theoretic models of solids and stresses dielectric and magnetic properties. Designed for physics, chemistry and engineering students. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. \$7.00. 396 p.

"Proceedings of the 39th Annual Convention, American Electroplaters' Society." Here, in book form, are the complete technical papers presented at Chicago in 1952. Many of the subjects covered have proved to be of continuing interest. American Electroplaters' Society, 445 Broad St., Newark, N. J. \$5.00. 272 p.



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## Technical Briefs

Engineering

### LOFTING:

Method saves time and materials.  
. . . Less skilled labor used.

A new and highly precise optical system is revolutionizing certain phases of lofting practice in European shipyards. The technique, developed in Germany during the last war, permits the optical projection of scale drawings directly and in full size on the material to be fabricated.

Extensive savings in materials, fewer errors resulting in reworks or rejects, elimination of the template storage problem, and reduction in skilled labor requirements are advantages claimed for the system.

#### Projected and Traced

With the Ampower Lumotrace system, a full scale layout of loft lines is no longer necessary. Lofting is done to one-tenth scale.

Lofting draftsmen prepare standard body frames, sections, and lines plans, to one-tenth scale. From there they develop (in the case of a ship) hull plating dimension drawings to the same scale. These drawings are photographed on glass negatives and projected directly onto steel plates. Unskilled workmen then trace the image on the plate and the plate is ready for fabrication.



FIRST STEP is to prepare a template drawing to one-tenth scale on a dimensionally stable paper.

### IF YOU WANT MORE DATA

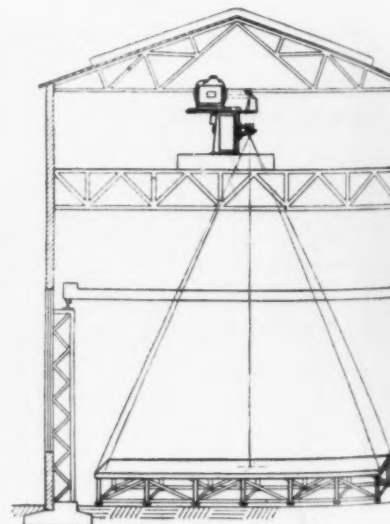
You may secure additional information on any item briefed in this section by using the reply card on page 103. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

American aircraft builders have used a similar system since World War II. However, due to the relatively small size of materials used, the optical problems encountered were less difficult. In projecting the draftsmen's original drawings onto the aluminum plates to be fabricated, for instance, the negative had to be magnified only four or five times.

#### Magnified 100 Times

In the shipbuilding industry, however, steel plates of up to 8 x 40 ft are used. Drawings must be magnified 100 times in order to get them up to full size.

For this reason it was thought impossible to use the system in America's wartime shipbuilding program. Aberrations inherent in the lenses then available would have introduced errors of unacceptable proportions.



ORIGINAL DRAWING is photographed on glass 4 x 5 in. negative and projected onto steel plate.



Since its first use in a German shipyard, the system has undergone many refinements. Equipment consists primarily of a high precision camera and optical projector. The camera unit is mounted on a vertical track and points downward to a glass topped table on which the drawings to be photographed are placed. The glass top is pressed over the drawings to insure flatness.

The projector is rigidly mounted in a suitable building so that it can be located about 30 ft above a special work table. It incorporates a powerful arc lamp or, in some installations, a high intensity mercury lamp. The projected image is of sufficient intensity to make darkening the room to any appreciable degree unnecessary.

#### Remote Control

A special lens of relatively short focal length enlarges the negative 100 times in lineal dimension or 10,000 times in area and projects the image without distortion directly on the work surface.

The projector is permanently adjusted for definition during assembly and thereafter requires no attention. A remote controller at the work table allows the projection unit to travel vertically within a range of about 20 in., enabling exact adjustments to be made in the scale factor.



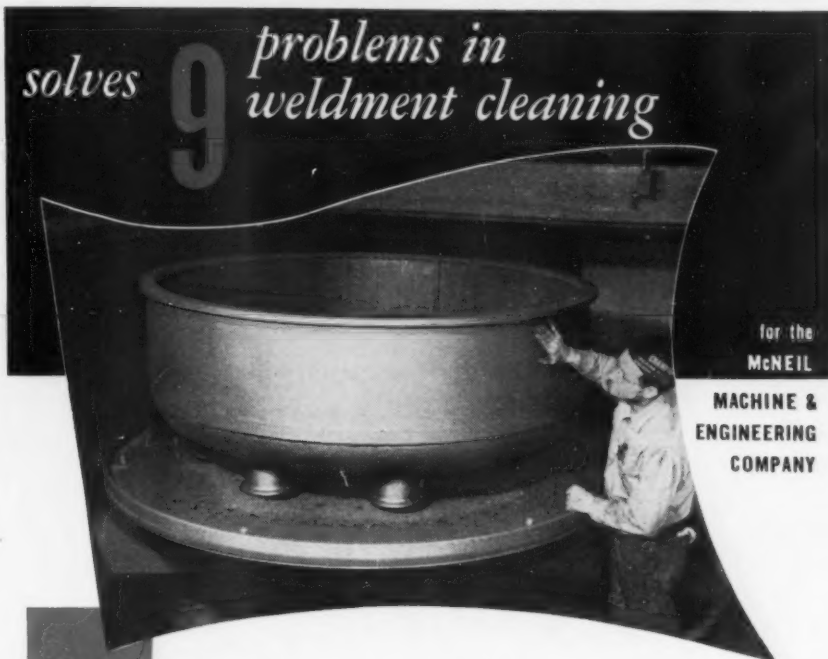
STEEL PLATES, securely clamped for flatness, are marked off from projected image. Image shows clearly when surroundings are dimly lit.

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## MATERIALS:

"Young" western coals artificially aged in Colorado.

Designed to make "young" Colorado coal grow several million years older in a matter of minutes, a new pilot plant for the test production of char has just been completed at the fully-integrated Pueblo steel mill of The Colorado Fuel & Iron

Corp. The new Petit char plant is the second of its kind in the world.

Colorado coal, some 80 million years younger than eastern coal, is more volatile. The char plant, a low-temperature furnace, removes part of the excess volatile matter. This yields a low-volatile coal or char for blending with other coals. Mixed with Colorado coking coal the char improves the quality of coke used in steel making.

The char plant handles 1 ton of coal per hour, yielding 1600 lb of char. Two burners feed flaming gas into a vertical chamber that zigzags 50 ft down the center of the tower, where a steady flow of coal is converted into char.

### Coal to Char

Begun in January of this year, the plant was constructed by CF&I engineers working with the Koppers Construction Co. of Pittsburgh. Plans were prepared by the Societe de Technique Industrielle of Paris, France, headed by M. Daniel Petit.

Now that char can be produced in quantity at Pueblo, the true value of this method of improving western coal can be established. Test charges in coke ovens and blast furnaces are planned as definite and final proof of the value of char blending.

### Began Study In 1942

However, this is not the first char plant used by CF&I. Back in 1942, an experimental Hayes retort was built near the site of the new Petit plant. Results of this experiment were reported throughout the world and played an important part in the development of char theory. Some parts of the old plant were utilized in the construction of the new one.

While it is too early to estimate the effect this test char plant will have on CF&I's future steel production, completion of the pilot char plant is a significant step in a long-range plan to utilize more fully local steelmaking resources.

### Use of Local Materials

Development of CF&I's new Allen mine in southern Colorado, with its intensive mechanization and materials handling systems is a major step in this program.

The Colorado Fuel & Iron Corp. is today the ninth largest steelmaking firm in the U. S. The fully-integrated Pueblo mill contributes about 60 pct of the corporation's rated annual ingot capacity of 2,466,000 tons. However, with 12 plants located throughout the United States, around half of CF&I's sales operations are now carried on east of the Mississippi.

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## QUALITY CONTROL:

### Particle analyzer speeds testing of powdered materials.

Quick, accurate analyses of particle size distribution in finely powdered materials are now possible with a new research instrument. Developed by Sharples Corp. Research Laboratories, Bridgeport, Pa., the instrument is both a research and production tool. Fast quality control checks on cements, pigments, metal powders, abrasives, ceramics and other powdered materials are possible.

In operation, about 100 mg of powder particles are dispersed in air and allowed to settle through a tube onto a highly sensitive balance. A continuous record of the weight of powder settled on the balance is then plotted against time. From this, a particle size distribution curve is obtained by applying Stoke's Law of Fall.

### Saves Time, Cuts Costs

Testing time is reduced considerably by use of the Micromerograph. Using a microscope, three technicians have worked as long as 4 months to count 70,000 particles. Their probable error was  $\pm 150$  pct. By Micromerograph analysis of the same material, one person can analyze billions of par-



QUICK, ACCURATE determination of particle size distribution in powdered metals, abrasives and ceramic materials may be made with the Micromerograph.

ticles in 15 min with a probable error of only  $\pm 3$  pct.

Other advantages include its ability to handle a wide range of particle sizes, simple sample preparation and positive deagglomeration of powder. Little technical skill is needed to operate the tester.

A powder feed system disperses the powder into a sedimentation system. This is done by releasing

pressurized dry nitrogen into the powder chamber and through a deagglomerator, carrying the powder with it. Shearing forces of the released gas form a cloud of particles in the top 20 cm of a 4-in. diam pressure-tight aluminum tube, 7 ft long.

A servo-electronic balance at the lower end of the sedimentation tube receives the particles on a balance pan as they settle.

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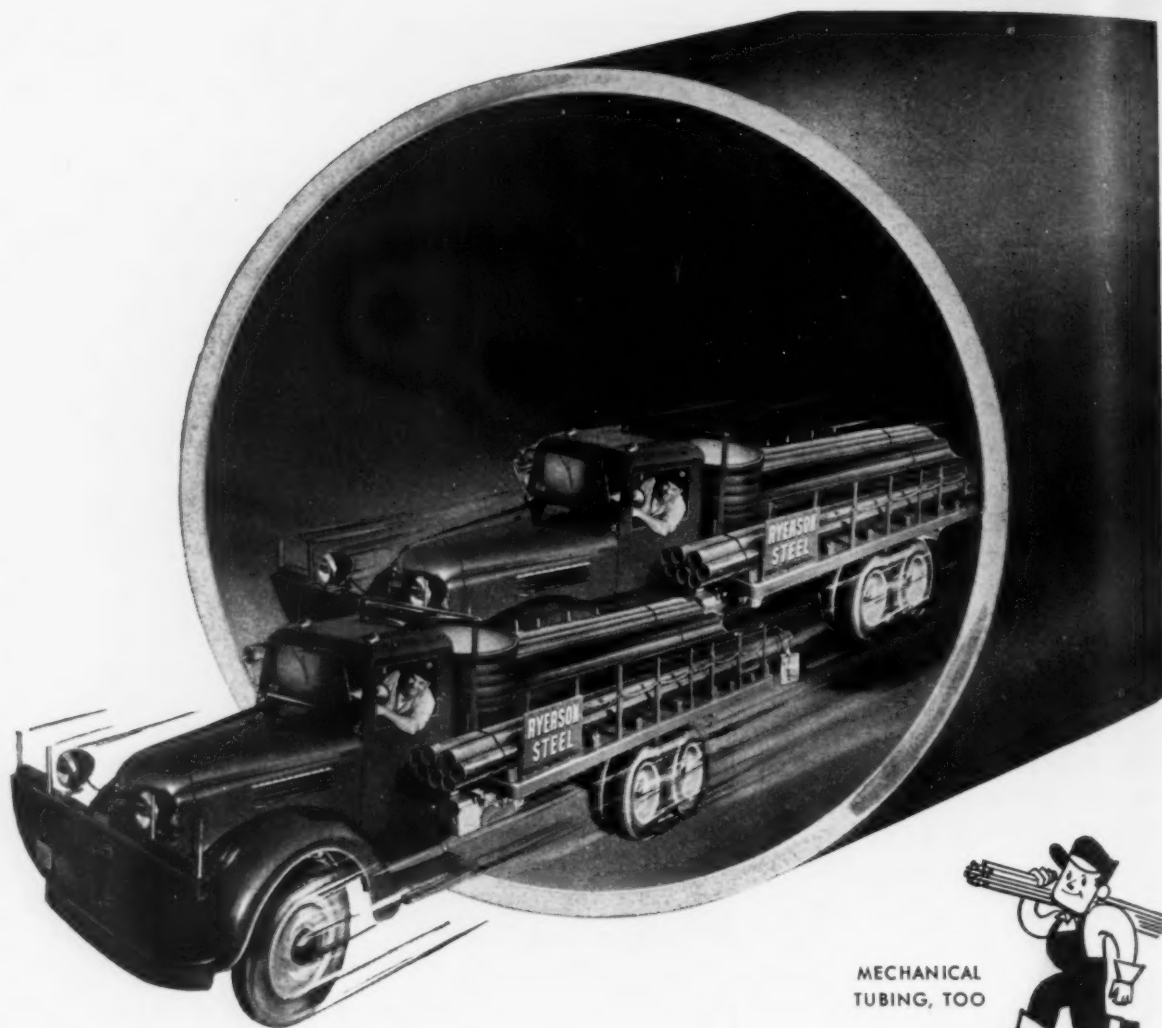
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That's because Ryerson stocks are large and complete, and Ryerson facilities for fast handling, cutting, loading and dispatching permit around-the-clock service. When a boiler is down a call to Ryerson will help you get it back in service fast. When you need tubes for routine replacement or regular production you can depend on Ryerson deliveries to keep your work schedule.

And all boiler tubes from Ryerson meet our Certified Quality standards, conform to all code requirements and are made and tested in accordance with the latest ASTM and ASME specifications. So you'll find that Ryerson tubes are easy to install—safe and long-lasting in service.

Another reason for calling Ryerson: you'll save time by ordering boiler tubes with all your other steel-from-stock requirements from one convenient source. One call, one order, one invoice does the work of many. So get in touch with your nearby Ryerson plant for boiler tubes and everything in steel.

### These Products, Too

Bent Boiler Tubes  
Condenser & Heat Exchanger Tubes  
Copper Ferrules  
Tube Expanders  
Heads-Flanged, Dished, etc.  
Manhole Covers & Fittings  
Manhole Saddles, Welding Flanges  
Flange & Fire Box Plates  
And everything in carbon,  
alloy & stainless steel

# RYERSON STEEL



JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT  
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

## How Firm Are Fourth Quarter Orders Placed Now?

**Firms who've opened fourth quarter books say orders are coming in nicely . . . But they can be cancelled later . . . Scrap prices advance again . . . Ingot rate at 95 pct.**

Steel demand seems to be passing another test with flying colors. Producers who have opened fourth quarter order books say they are filling up at a highly satisfactory rate.

Despite mill efforts to get their books current during the third quarter, it appears inevitable that there will still be some carryovers (undelivered orders) entering the fourth quarter. And some regional sales offices have told the home office their quotas aren't big enough to satisfy all their customers.

**Reach Better Balance . . .** This should quiet any fear that the market is ready to come apart at the seams. Yet there's no denying that steel supply and demand are closer to balance than at any time since the start of the Korean conflict. Were it not for the fact that general business activity has exceeded most estimates, the pendulum would have swung much faster.

In the few short weeks since signing of the steel wage contract the frenzy has left the market. Stated demand still exceeds supply, but the margin is getting narrower. Urgent requests by consumers for "quick" tonnage to bail them out of production jams are definitely on the decline.

**Rebuild Inventories . . .** Steel consumers seem to be changing from a period of hand-to-mouth production to a period of inventory accumulating and balancing. Some consumers are admittedly expecting to rebuild and balance their inventories over the next several months. This means they are placing orders for more steel than they expect to consume.

Conversion business (buying ingots from one supplier and paying to have them finished by another) is at a standstill. Most old contracts are being fulfilled, but consumers are betting they will be able to fill their needs from regular mill sources by fourth quarter. They are refusing to make conversion commitments beyond the third quarter. This is a tough decision for purchasing agents to make.

**Seasonal Patterns Return . . .** Another indication that supply and demand are nearing balance is the return of seasonal factors in the market. At the height of the shortage, steel products were almost uniformly tight. Not so today—demand for various products is shifting.

One change-about is plates: Light plates are tighter, but heavier plates are easier. Structural are surprisingly tight, as construction activity surpasses estimates. Some of the tightest items, such as carbon and alloy bars in larger sizes and hot and cold-rolled sheets, are turning a bit easier.

Galvanized sheets, which had been lagging, are suddenly tight. Oil country goods, though still tight, aren't so critical as a few months ago.

**Farm Equipment Booms . . .** Most alloy products are in strong demand, but pressure has eased some after reshuffling of military contracts. Stainless steel is tight as ever. Warehouse sales are high.

Nowhere is the seasonal influence more apparent than in farm equipment. After being listed among the ailing during the first quarter, this industry has bounced

back with a bang. Early declines have been wiped out and demand is at a healthy level. Those who were concerned about inventory are reminded that farmers don't usually order equipment until the morning of the day they need it.

**Auto Needs High . . .** Automakers continue to have more impact on the steel market than any other group of customers. Repeated assurances from them are beginning to temper if not quiet predictions of decline in steel demand later this year.

Despite model changes and possibility of sales slowdown, they insist their steel demand will continue in the fourth quarter. They intend to use this period for beefing up inventories and bringing them into balance—at regular mill prices.

**Fear Cancellation Epidemic . . .** Steel producers are pleased with the way fourth quarter order books are shaping up, supported by healthy demand from major steel consuming groups. But they know that orders can be cancelled anytime before shipment. And once cancellations start they can become contagious.

Since cancellation is so easy, it makes good sense to have your order on the books—just in case. Steel people would like to know how many customers are motivated by this thinking.

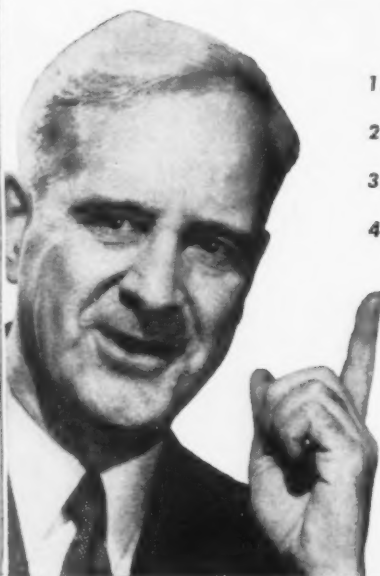
**Scrap Up More . . .** The scrap market continues strong. THE IRON AGE Steel Scrap Composite Price advanced \$0.33 a ton to \$43.83 per gross ton. This is the seventh consecutive week this price index has risen.

Steelmaking operations this week are scheduled at 95 pct of rated capacity up 3 points from last week's revised rate.

# FOUR GOOD REASONS TO Call Solar!

You'll never overcome your need for steel,  
so isn't it good business to add a dependable  
**PRODUCTION** steel warehouse to  
your supplier list now?

Solar's nine **PRODUCTION** warehouses  
will **Save You Money**  
in these four ways:



1. Store the steel you need and deliver it as required, saving you inventory costs.
2. Process the steel you need for your own special requirements, at lower costs than you can do it.
3. Keep you in steel and prevent production down-time.
4. Give you more plant space by eliminating areas you now use for storage and processing.

Call SOLAR for:

Sheet & Strip—HR, HRP & CR  
Alloy & Carbon Bars—HR & CF  
Plates and Shapes  
Galvanized and Tin mill products  
Long Ternes Drill Rod  
Seamless and Welded Tubing  
Tool and Maintenance Steels



*"for service dependable as the sun"*  
**SOLAR STEEL CORPORATION**

General Offices: UNION COMMERCE BUILDING, CLEVELAND, OHIO

See your local classified telephone directory for our nearest office address

SALES OFFICES: Bridgeport • Chicago • Cincinnati • Cleveland • Detroit • Grand Rapids • Kalamazoo • Milwaukee • Nashville  
Philadelphia • River Rouge, Mich. • Rochester, N. Y. • Toledo • Union, N. J. • Washington, D. C. • Worcester, Mass.

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## Market Briefs and Bulletins

**Raise Pig Iron Prices . . .** A general across-the-board price increase of \$1.50 per gross ton has been effected by the nation's pig iron producers. Some of the increases were made late in June, others early this month. As a result of the price rise, THE IRON AGE Pig Iron Composite Price moved up in two steps to \$56.76 per gross ton. Only price boost of more than \$1.50 was a \$3.75 per ton increase made by Mystic Iron Works, Everett, Mass., which bases its quarterly prices on production costs of the preceding quarter.

**Will Start Tin Production . . .** Operation of sheet and tin mill finishing equipment at U. S. Steel's Fairless Works will start this quarter. Volume and size range of shipments will be limited during early stages of production. Base prices established for the Fairless Works are: Carbon hot-rolled sheets (18 ga and heavier), \$80.50 per ton; carbon cold-rolled sheets, \$97.50 per ton; common coke tinplate, \$8.80 per base box 100 lb; Ferrostan (electrolytic tinplate), \$7.50 per base box 100 lb; blackplate, \$6.60 per base box 100 lb.

**More Steel, Iron Shipments . . .** Railroads expect to handle a large volume of iron and steel as well as ores and concentrates during the third quarter. Estimates by the National Assn. of Shippers Advisory Boards indicate steel and ore freight carloadings will be about one-third greater than for the same period last year. Other sizable anticipated shipping increases are: Vehicle parts, up 49.3 pct; agricultural machinery and equipment, 16.2 pct; non-ferrous metals, 9 pct; heavy machinery, boilers, 7.3 pct.

**Lose Fewer Man-days . . .** Strike idleness in May amounted to 3 million man-days, Dept. of Labor reports. This was about 20 pct more than in April, but less than one-half the total for May, 1952. Bureau says strike idleness for the first 5 months 1953 is less than half last year's total for the same period.

**Close Down Isabella . . .** U. S. Steel Corp. is closing down its 83-year-old Isabella furnaces at Etna, Pa., early in August. World War II and the Korean conflict extended the life of these old ferromanganese producers, scheduled for shutdown at least 10 years ago. More modern facilities at the company's Duquesne Works will make up for the lost output.

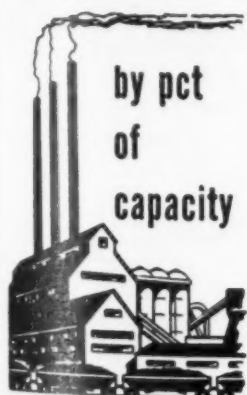
**Ship Pig From West . . .** Current slump of California's foundry business may soon result in the shipment of western pig iron to eastern markets. Kaiser Steel Corp., which has gained a small pig surplus since its third blast furnace went into production, has contracted for a token shipment to Caterpillar Tractor Co., Peoria, Ill. Eastern markets are being studied for sales potential until Fontana rolling capacity can be increased.

**Recondition Lead, Zinc Mines . . .** Chief Consolidated Mining Co., Salt Lake City, with the aid of a government contract, plans to recondition its properties in the Tintic Mining district of Utah for large-scale production of lead and zinc. Defense Materials Procurement Agency will advance \$283,000 of the \$1.4 million conditioning cost to be repaid from new production. Close to 500,000 tons of lead, zinc, copper, and some gold and silver is expected to be mined.

**Industrial Production Up . . .** During the last week in June, industrial production of the Pittsburgh district was up 5 pct from the preceding week, reports Bureau of Business Research, University of Pittsburgh. Freight shipments showed a slight increase, and the overall business index hit 205.4, the highest level since February.

**Canada Operating Near Capacity . . .** Production of steel ingots and castings in April amounted to 362,291 net tons, for an average operating rate of 95.3 pct of capacity. Output during April 1952 was 354,342 tons.

## STEEL OPERATIONS

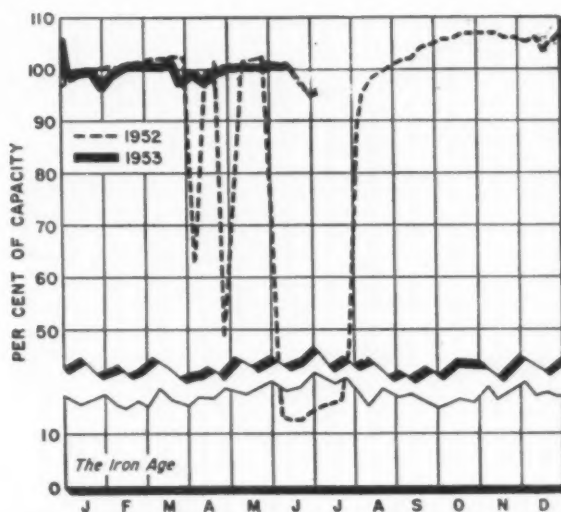


District Operating Rates

District	Week of July 5	Week of June 28
Pittsburgh	98.0	93.0*
Chicago	98.5	102.5
Philadelphia	97.5	96.0
Valley	97.0	96.0*
West	101.0	101.5*
Cleveland	91.0	88.5
Buffalo	106.5	106.5
Detroit	86.0	105.0
Birmingham (South)	101.0	99.5
Wheeling	98.0	100.0
South Ohio River	85	89.5
St. Louis	107.5	107.5
East	77.0	86.5
AGGREGATE	95.0	92.0*

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.

\* Revised



## Alcoa-USW Wage Talks Continue

**Negotiations in the aluminum industry have been quiet so far . . . Neither side lets out information . . . USW bargaining position stronger than in steel—By R. L. Hatschek.**

Aluminum industry labor negotiations continued into the early part of this week in a quiet manner. Discussions between Aluminum Co. of America and the United Steelworkers have been both brief and peaceful. Up to this Monday, the talks were pretty much of an exploratory nature with neither side giving out any details.

The USW newspaper, *Steel Labor*, asks, "Why should wage rates in the aluminum industry trail those in the steel industry?" This may be the key to the union's attack but it may also be merely a bargaining gambit.

**Stronger Position . . .** While the aluminum workers traditionally go after a settlement very close to that won by steel labor, the bargaining position of the USW is stronger in aluminum than it was in steel this year.

Last year the average steelworker lost over \$600.00 in wages during the long strike. Aluminum workers lost no pay in their drive for economic concessions.

**Aluminum Shorter . . .** The steel market is still tight—but not nearly as tight as the aluminum market is. Any work stoppage in the aluminum industry would severely dislocate the market.

No strike has been threatened as yet. But with labor negotiations the possibility of one must never be discounted. The USW is in a position where it could abandon tradition by going after a bigger package in aluminum than it has won in steel.

**No Signs . . . Steel Labor** gives no hint as to what the union's goal is. No mention is made of wages except that they should be as high as those in steel. Nothing is said of a guaranteed annual wage, nor of the union shop which was such a big issue in steel last year. Not even the elimination of geographic pay differentials is noted. But, in all probability, these are high in the minds of union leaders.

One thing that does get attention is the job classification study. Another is the standardization of contracts between the union and all aluminum producers.

**Deadline July 31 . . .** Current agreements with Alcoa and Reynolds Metals Co. expire at the end of this month while Kaiser Aluminum & Chemical Co. faces renegotiation of wages only. Bargainers for Alcoa and the USW met this Monday—but again no information was divulged by either party. Negotiators now total six on each side.

**Shift to High . . .** Alcoa's \$5.6 million fabrication expansion at the Vancouver, Wash., plant swung into high gear last week. Following the casting of the first dozen 1000-lb ingots ever made there, engineers were concentrating on rolling facilities.

Final completion of the ingot casting facilities is expected by late summer and the \$2.7 million extrusion plant is scheduled for operation in mid-1954. This will eventually consume all ingots cast but for the present they will be sent to other Alcoa plants or sold.

**No Price Change . . .** Latest reports indicate that Chile has postponed any action on its copper policies. The price remains at 36.50¢ per lb delivered Connecticut Valley. A Chilean copper group may be sent to the U. S. for discussion of the problem with the Chilean ambassador. Eventual result may well be a Chilean-U. S. agreement on copper policy.

Meanwhile, the domestic copper market continues quiet with indications that the current quotation of 29.75¢ to 30.00¢ may not last very much longer.

**Tin Continues Skid . . .** Almost every day the three main tin trading centers, New York, London and Singapore, rack up new lows for prices since the fireworks began in Korea 3 years ago. Trading in New York was almost nonexistent last Friday because of the holiday weekend and the price for prompt delivery dropped to 87¢ per lb.

Bolivian Ambassador Victor Andrade has indicated a hope that steps may be taken this week toward the settlement of a long-term tin contract between the South American country and the U. S.

**Lead, Zinc Quiet . . .** The holiday also had its effect on the lead and zinc markets. Lead demand continued fairly strong while zinc was not so active. Prices remain unchanged.

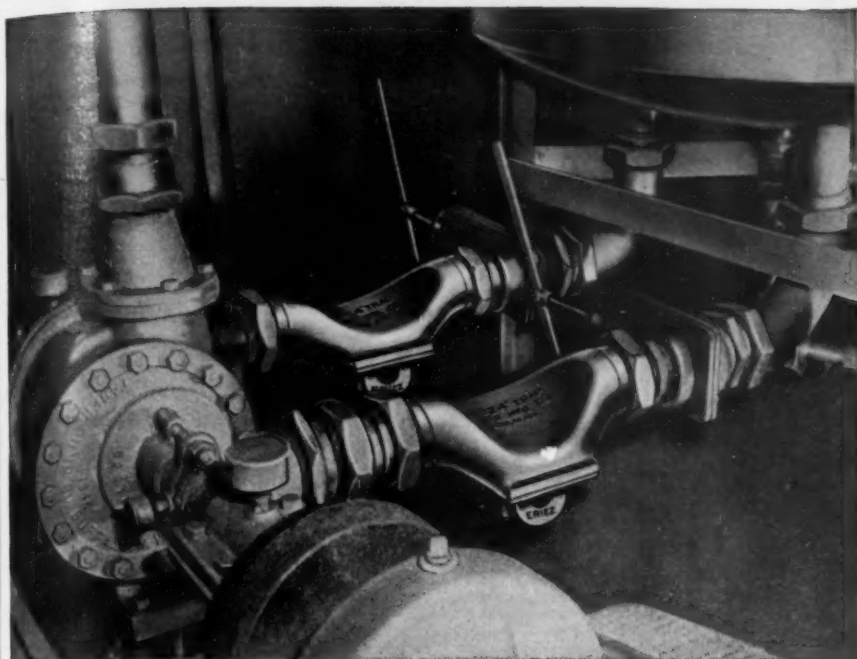
### NONFERROUS METAL PRICES

(Cents per lb except as noted)

	July 1	July 2	July 3	July 4	July 6	July 7
Copper, electro, Conn. ....	29.75-	29.75-	29.75-	....	29.75-	29.75-
	30.00	30.00	30.00	....	30.00	30.00
Copper, Lake delivered ....	30.125	30.125	30.125	....	30.125	30.125
Tin, Straits, New York ....	89.50	88.00	87.00	....	84.75	84.75*
Zinc, East St. Louis ....	11.00	11.00	11.00	....	11.00	11.00
Lead, St. Louis ....	13.30	13.30	13.30	....	13.30	13.30

Note: Quotations are going prices.

\*Tentative



**ERIEZ MAGNETIC PIPELINE TRAPS**, widely used in the process industries, provide the superior magnetic strength of a high nickel alloy . . . ALNICO . . . to assure positive trapping of tramp iron. Housings are non-magnetic chromium-nickel stainless steel castings . . . leak-proof, easy to install and simple to clean. Completely non-electric . . . first cost is last cost . . . since magnets hold strength during life of equipment.

**1,045 PIECES OF TRAMP IRON REMOVED** ahead of vane-type displacement pump in food production line during a 30-day period, by an ERIEZ Permanent (non-electric) Magnetic Pipeline Trap.



## Prevent

- **Machinery Damage**
- **Product Contamination**
- **Production Tie-Ups**

## ...Automatically, with Eriez Magnetic Traps

Look at this pile of tramp iron...

Trapped ahead of a pump in a large food plant during a 30-day processing period... it exemplifies how "protection plus" is obtained automatically with pipeline traps produced by ERIEZ MANUFACTURING COMPANY, Erie, Pa.

To keep liquid flow lines free of ferrous materials ranging in size from minute particles to large pieces of tramp iron, ERIEZ pipeline traps utilize the strong magnetic properties of Alnico permanent magnets containing a high percentage of nickel.

Use of this aluminum-nickel-cobalt-iron alloy not only permits trap designs that eliminate need for electromagnets requiring current and acces-

sory equipment, but its use also allows reduction of space and weight requirements to desirable limits.

The addition of nickel... an essential in Alnico... improves scores of other alloys utilized throughout industry. Consult us on use of nickel or nickel alloys in your products or equipment.

Send details of your metal problems for our suggestions. •

At the present time, nickel is available for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.



**THE INTERNATIONAL NICKEL COMPANY, INC.** 67 WALL STREET  
NEW YORK 5, N. Y.

July 9, 1953

157



# Nonferrous Prices

(Effective July 7, 1953)

## MILL PRODUCTS

(Cents per lb, unless otherwise noted)

### Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188-in., 2S, 3S, 32.9¢; 4S, 61S-O, 84.9¢; 52S, 37.2¢; 24S-O, 24S-OAL, 35.9¢; 76S-O, 76S-OAL, 43.6¢. 0.081-in., 2S, 3S, 34.1¢; 4S, 61S-O, 86.6¢; 52S, 38.9¢; 24S-O, 24S-OAL, 37.2¢; 76S-O, 76S-OAL, 45.7¢. 0.032-in., 2S, 3S, 35.9¢; 4S, 61S-O, 40.6¢; 52S, 43.5¢; 24S-O, 24S-OAL, 45.6¢; 76S-O, 76S-OAL, 57.0¢.

Plate, 1/4-in. and Heavier: 2S-F, 3S-F, 30.9¢; 4S-F, 38.0¢; 52S-F, 34.7¢; 61S-O, 33.6¢; 24S-O, 24S-OAL, 35.4¢; 76S-O, 76S-OAL, 42.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 26.4¢ to 80.3¢; 12 to 14, 37.1¢ to 97.2¢; 24 to 26, 89.7¢ to \$1.27; 36 to 38, 47.0¢ to \$1.86.

Rod, Rolled: 1.066-in. to 4.5-in., 2S-F, 3S-F, 41.0¢ to 86.6¢; cold-finished, 0.375-in. to 3.499-in., 2S-F, 3S-F, 44.2¢ to 35.3¢.

Screw Machine Stock: Rounds, 11S-T3, 1/2 to 1 1/2 in., 58.4¢ to 45.9¢; 1/4 to 1 1/2 in., 45.3¢ to 42.6¢; 1 1/2 to 3 in., 42.0¢ to 39.3¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 45.2¢ to \$1.7¢; 52S, 52.4¢ to 38.3¢; 17S-T4, 59.0¢ to 41.0¢; 61S-T4, 52.9¢ to 40.6¢.

Extruded Tubing: Rounds, 63S-T5, OD 1 1/4 to 2 in., 40.6¢ to 59.0¢; 2 to 4 in., 36.6¢ to 49.7¢; 4 to 6 in., 37.1¢ to 45.3¢; 6 to 9 in., 57.6¢ to 47.5¢.

Roofing Sheet: Flat, per sheet, 0.019-in., 2S x 72 in., \$1.247; x 96 in., \$1.662; x 120 in., \$2.077; x 144 in., \$2.494. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢; 0.024 in. x 28 in., 29.8¢.

### Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, 1/4 in., 66¢; 3/16 in., 68¢; 1/8 in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 77¢; 1/2 to 1 in., 60.5¢; 1 1/4 to 1.749 in., 56¢; 2 1/4 to 5 in., 51.5¢. Other alloys higher. Base up to 1/2 in. diam, 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.067 in. wall thickness: OD, 1/4 to 5/16 in., \$1.43; 5/16 to 1/2 in., \$1.29; 1/2 to 3/4 in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, 1/4 to 1/2 in., 64¢; 1 to 2 in., 60¢; 2 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1 1/2 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

### Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$6.

### Nickel Monel, Inconel

(Base prices, f.o.b. mill)

"A" Nickel Monel	Inconel
Sheet, CR .....	86 1/2
Strip, CR .....	92 1/2
Rod, bar .....	82 1/2
Angles, HR .....	82 1/2
Plate, HR .....	84 1/2
Seamless Tube .....	115 1/2
Shot, blocks .....	60

### Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper .....	48.51	46.83	50.58
Copper, h-r .....	50.48	46.83	50.58
Copper, drawn .....	48.51	46.83	50.58
Low brass .....	45.99	45.68	45.68
Yellow brass .....	42.87	42.56	42.56
Red brass .....	47.11	46.80	46.80
Naval brass .....	47.01	41.87	42.33
Lead brass .....	48.76	48.45	39.95
Comm. bronze .....	50.73	44.62	46.18
Mang. bronze .....	70.50	70.75	70.75
Muntz metal .....	44.91	40.47	41.72
Ni silver, 10 pct .....	58.56	59.83	62.89

## PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed .....

Aluminum pig .....

Antimony, American, Laredo, Tex. .....

Beryllium copper, per lb conta'd Be .....

Beryllium aluminum 5% Be, Dollars per lb contained Be .....

Bismuth, ton lots .....

Cadmium, def'd .....

Cobalt, 97-99% (per lb) .....

Copper, electro, Conn. Valley .....

Copper, Lake, delivered .....

Gold, U. S. Treas., dollars per oz. .....

Indium, 99.8%, dollars per troy oz. .....

Iridium, dollars per troy oz. .....

Lead, St. Louis .....

Lead, New York .....

Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb. .....

Magnesium, sticks, 100 to 500 lb. .....

Mercury, dollars per 76-lb. flask, f.o.b. New York .....

Nickel electro, f.o.b. N. Y. warehouse .....

Nickel oxide sinter, at Copper Creek, Ont., contained nickel .....

Palladium, dollars per troy oz. .....

Platinum, dollars per troy oz. .....

Silver, New York, cents per oz. .....

Tin, New York .....

Titanium, sponge .....

Zinc, East St. Louis .....

Zinc, New York .....

Zirconium copper, 50 pct .....

## REMELTED METALS

### Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot

No. 115 .....

No. 120 .....

No. 123 .....

80-10-10 ingot

No. 305 .....

No. 315 .....

88-10-2 ingot

No. 210 .....

No. 215 .....

No. 245 .....

Yellow ingot

No. 405 .....

Manganese bronze

No. 421 .....

### Aluminum Ingot

(Cents per lb del'd, 30,000 lb and over)

95-5 aluminum-silicon alloys

0.30 copper, max. ....

0.60 copper, max. ....

Piston alloys (No. 122 type) .....

No. 12 alum. (No. 2 grade) .....

108 alloy .....

195 alloy .....

13 alloy (0.60 copper max.) .....

ASX-679 .....

### Steel deoxidizing aluminum, notch-bar

granulated or shot

Grade 1—95-97 1/2% .....

Grade 2—92-95% .....

Grade 3—90-92% .....

Grade 4—85-90% .....

## ELECTROPLATING SUPPLIES

### Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper

Cast, oval, 15 in. or longer .....

Electrodeposited .....

Flat rolled .....

Brass, 80-20

Cast, oval, 15 in. or longer .....

Zinc, flat cast .....

Ball, anodes .....

Nickel, 99 pct plus

Cast

Roller, depolarized .....

Cadmium .....

Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. ....

### Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum .....

Copper sulfate, 99.5 crystals, bbl. ....

Nickel salts, single or double, 4-100 lb bags, frt. allowed .....

Nickel chloride, 375 lb drum .....

Silver cyanide, 100 oz lots, per oz. ....

Sodium cyanide, 96 pct domestic 200 lb drums .....

Zinc cyanide, 100 lb drum .....

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over.)

	Heavy	Turnings
Copper .....	28%	27%
Yellow brass .....	21%	19%
Red brass .....	25%	24%
Comm. bronze .....	26%	25%
Mang. bronze .....	30%	19%
Brass rod ends .....	19%	....

### Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire .....

No. 2 copper wire .....

Light copper .....

\*Refinery brass .....

\*Dry copper content.

### Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire .....

No. 2 copper wire .....

Light copper .....

No. 1 composition .....

No. 1 comp. turnings .....

Rolled brass .....

Brass pipe .....

Radiators .....

### Aluminum

Mixed old cast .....

Mixed new clips .....

Mixed turnings, dry .....

Pots and pans .....

### Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

### Copper and Brass

No. 1 heavy copper and wire. ....

No. 2 heavy copper and wire. ....

Light copper .....

New type shell cuttings .....

Auto radiators (unsweated) .....

No. 1 composition .....

No. 1 composition turnings .....

Unlined red car boxes .....

Cocks and faucets .....

Mixed heavy yellow brass .....

Old rolled brass .....

Brass pipe .....

New soft brass clippings .....

Brass rod ends .....

No. 1 brass rod turnings .....

### Aluminum

Alum. pistons and struts .....

Aluminum crankcases .....

2S aluminum clippings .....

Old sheet and utensils .....

Borings and turnings .....

Misc. cast aluminum .....

Dural clips (24S) .....

### Zinc

New zinc clippings .....

Old zinc .....

Zinc routings .....

Old die cast scrap .....

### Nickel and Monel

Pure nickel clippings .....

Clean nickel turnings .....

Nickel anodes .....

Nickel rod ends .....

New Monel clippings .....

Clean Monel turnings .....

Old sheet Monel .....

Nickel silver clippings, mixed. ....

Nickel silver turnings, mixed. ....

### Lead

Soft scrap, lead .....

Pattery plates (dry) .....

Batteries, acid free .....

### Magnesium

Segregated solids .....

Castings .....

### Miscellaneous

Block tin .....

No. 1 pewter .....

No. 1 auto babbitt .....

Mixed common babbitt .....

Solder joints .....

Siphon tops .....

Small foundry type .....

Monotype .....

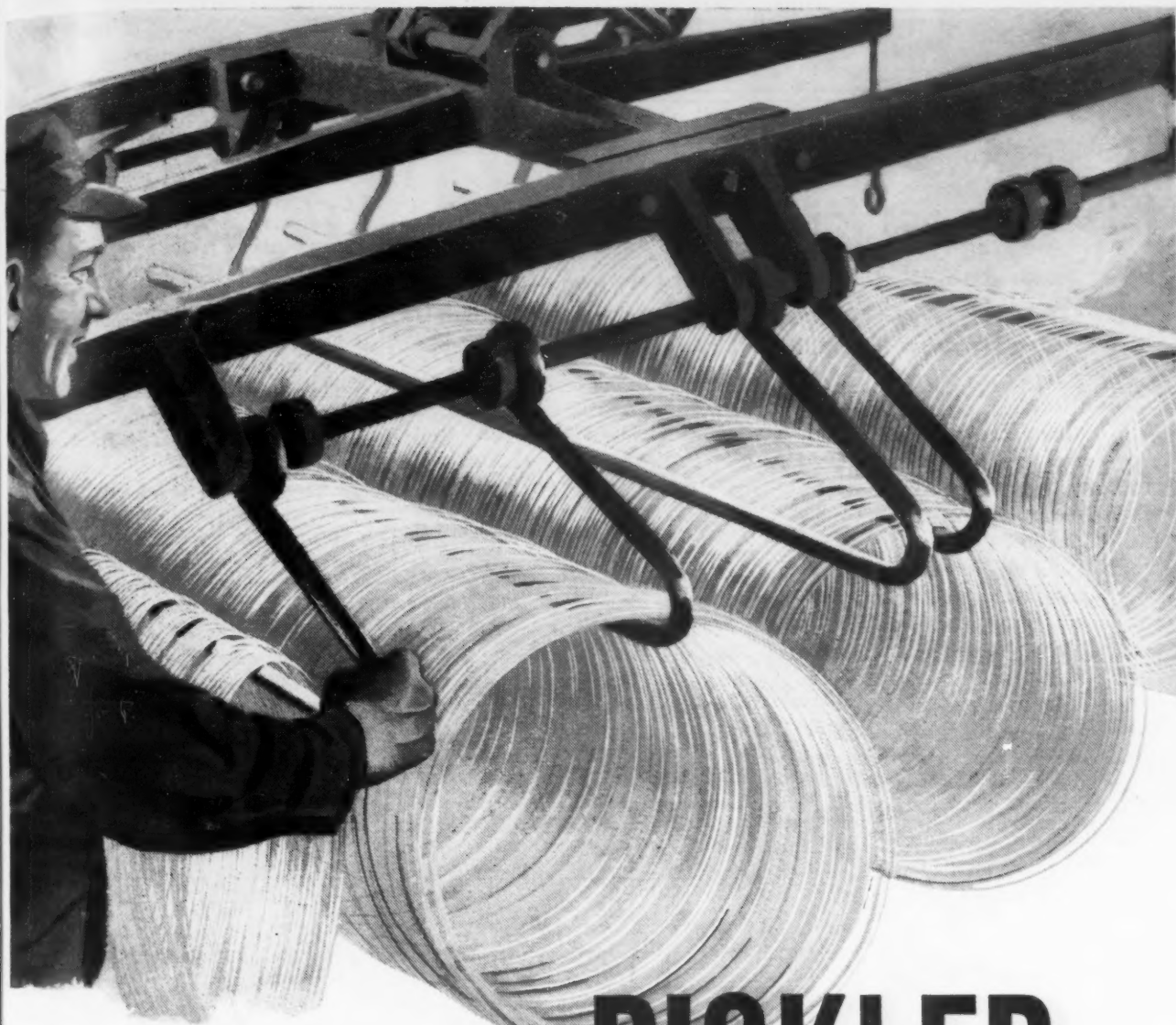
Lino. and stereotype .....

Electrotype .....

Hand picked type shells .....

Lino. and stereo. dross .....

Electro dross .....



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Boston	Detroit	Minneapolis	Providence	
Chicago	Houston	Newark	Rochester†	
Cincinnati	Indianapolis	New Orleans	St. Louis	(†sales office only)

July 9, 1953

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# Iron and Steel Scrap Markets

## ISIS Condemns Military Competition

**Dumps problem of military preparing its own scrap into lap of Congress . . . Cites uneconomic operation . . . Keep industry strong for crisis . . . Military buying baling presses.**

An incensed Institute of Scrap Iron & Steel took its case of business ethics to Congress—should government agencies compete with private enterprise, in this case the scrap industry?

Protesting a \$30 million Defense Dept. appropriation covering preparation and transportation of scrap, the Institute pointed out that return of overseas scrap to an already depressed market wouldn't help. It objected more strongly to military purchases of scrap processing equipment.

Not only is government scrap preparation unfair—but it is uneconomic. The Institute reported that Army Ordnance's baling press at Anniston, Ala., baled under 1000 tons of light iron yearly—while the investment in equipment was \$25,000.

If the industry is important enough to be controlled and declared vital in crisis, said Edwin C. Barringer of the Institute, the government should not compete with it. Instead it should place its scrap on sale to the highest bidder and keep the industry strong.

Mr. Barringer mentioned six military sites where baling presses were operating or having presses installed and six presses which are on order.

**Pittsburgh** — Market is showing continued strength. But there are faint signs that prices may be tending to level off. Two consumers report that more material appears to be available on basis of offerings by brokers. No new buying is in prospect, with activity largely limited to filling of old orders. Prices are unchanged. Blast furnace scrap is firm, cast market moderately strong.

**Chicago**—The trade was optimistic despite a lack of any heavy buying. Dealers without orders are willing to

lay down material in all grades including turnings and cast. Broker buying prices equal last week's consumer-delivered prices, and offerings to the mills are moving up in price. Asking prices for turnings continued to crawl up last week despite few sales. Steelmaking grades moved up slightly to follow railroad increases.

**Philadelphia**—While prices and the general market tone are unchanged following Independence Day, many dealers are feeling bullish. Other segments of the trade dispute the belief that prices will go up any more. It's believed that mill resistance will build up in the face of any efforts to boost scrap prices. Yard intake has improved considerably.

**New York**—Although no rash of heavy ordering materialized here, the market was optimistic. Price strength was exhibited by all items save cast iron grades. No. 1 continued to rise and No. 2 bundles registered a price hike. Brokers still continued to look to the West for orders but higher prices there were just not high enough to take scrap out of the area.

**Detroit**—Some slight strength appeared in this market last week. Movement was not unusually brisk, but No. 2 steelmaking grades and turnings showed increases ranging from \$1 to \$2. No. 1 heavy melting climbed \$2 on the basis of market appraisal and maintaining a differential with other grades.

**Cleveland**—Markets here and in the Valley have settled down momentarily, but it wouldn't take much to push prices higher. No one questions the market's strength but some are wondering whether it will rise much higher. This week's activity was centered in Youngstown, where a consumer bought No. 1 electric furnace bundles, a premium grade, for \$48. Low phos plate was bought for \$49, up \$1.

**Birmingham**—The scrap market continued slow this week. The two largest buyers of steel mill scrap were out of the market, but were expected to return soon. Some brokers said middle of the month orders were not yet completed but would be within the 30-day period allowed. A little electric furnace scrap was on order this week but the cast market was practically at a standstill.

**St. Louis**—An East Side mill brought approximately 1200 to 1500 tons of No. 1 heavy melting steel at an advance of \$5 a ton. No. 2 was up \$2 a ton on the strength of heavy purchases by a melter outside of the district and the expectation that two district mills would come into the market for substantial tonnages within a few days. Brokers' covering was also a factor in upping prices, as well as the shortage of scrap iron.

**Cincinnati**—Current prices may hold steady for month of July. Material is moving in good volume to local consumers. Blast furnace supplies appear to be more than adequate. Market generally is firm with no change in prices. Cast scrap is beginning to show strength.

**Boston**—This week saw a continuation of the higher price trend for scrap in the New England market. Gains were registered by No. 1 and No. 2 steel, No. 2 bundles, low phos, machine shop turnings and heavy breakable cast. Trading is fairly active but tempered by vacation periods.

**Buffalo**—Steady to firmer tendencies rule the market as the top mill consumer has placed substantial new orders within prevailing price ranges. Dealers were slightly disappointed that firmer markets here and in other areas did not lead to higher prices. Water receipts included about 3000 tons via canal from eastern seaboard.

**West Coast**—Scrap dealers watching prices going up all over the U. S. were glad last week when theirs didn't drop. Major development was re-entry of Kaiser into the market at Los Angeles on a modest scale but sooner than anticipated. Principal purchase was in No. 2 bundles, which are currently in poor demand in southern California.



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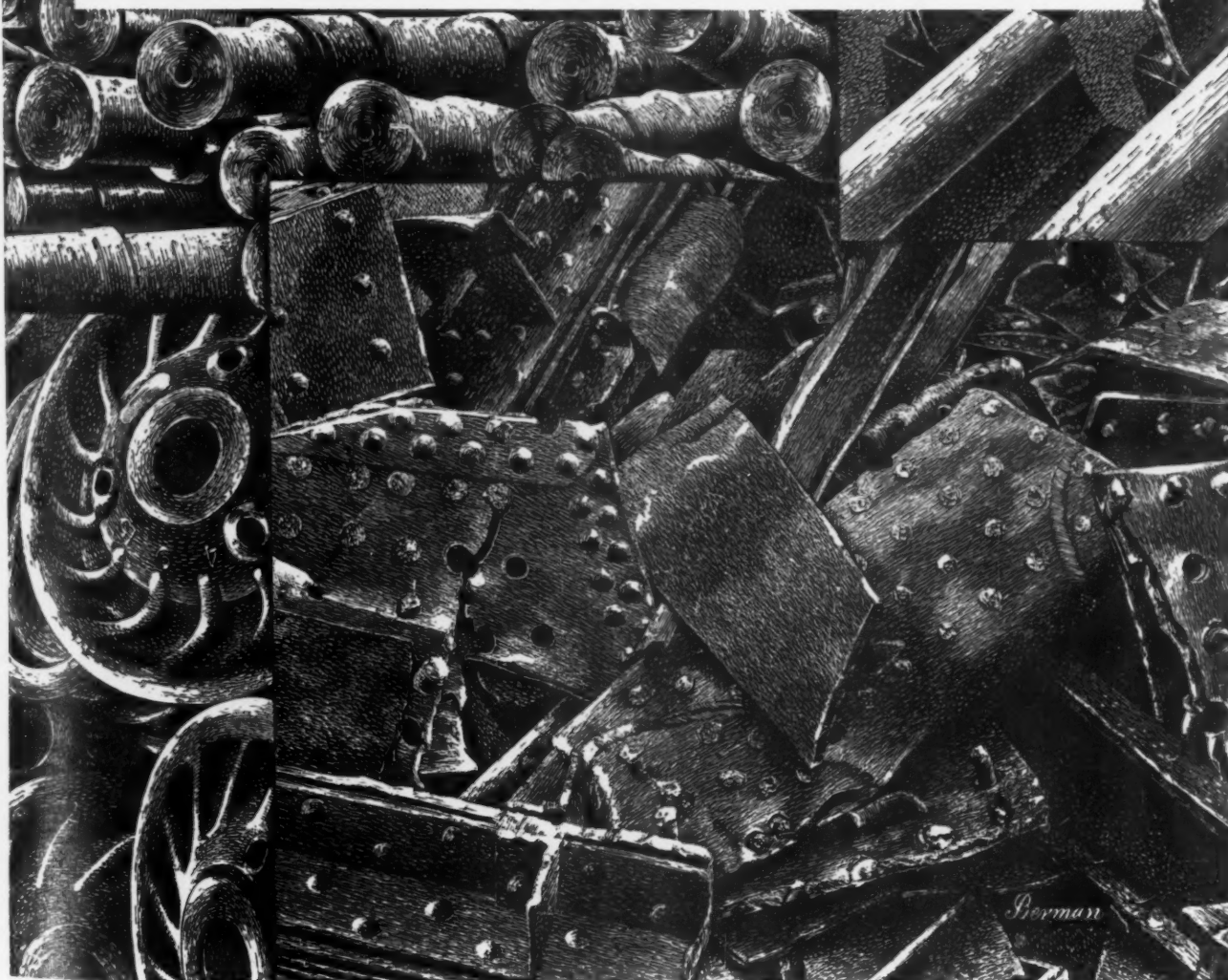
PLANTS  
LEBANON, PENNA. DETROIT (ECORSE),  
READING, PENNA. MICHIGAN  
MODENA, PENNA. PITTSBURGH, PENNA.  
ERIE, PENNA.



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SEATTLE, WASH.

**LEADERS IN IRON AND STEEL SCRAP SINCE 1869**



# Scrap Prices

(Effective July 7, 1953)

## Pittsburgh

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	39.00 to 40.00
Machine shop turn	26.00 to 27.00
Mixer bor. and ms. turns	26.00 to 27.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. punch'gs, plate	48.00 to 49.00
Heavy turnings	41.00 to 42.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	54.00 to 55.00
RR. steel wheels	51.50 to 52.50
RR. spring steel	51.50 to 52.50
RR. couplers and knuckles	51.50 to 52.50
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Malleable	48.00 to 49.00

## Chicago

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	37.00 to 39.00
No. 1 factory bundles	42.00 to 44.00
No. 1 dealers' bundles	41.00 to 42.00
No. 2 dealers' bundles	35.00 to 37.00
Machine shop turn.	22.00 to 24.00
Mixed bor. and turn	25.00 to 26.00
Shoveling turnings	25.00 to 27.00
Cast iron borings	25.00 to 27.00
Low phos. forge crops.	48.00 to 49.00
Low phos. punch'gs, plate	45.00 to 46.00
Low phos. 3 ft and under	45.00 to 47.00
No. 1 RR. hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	48.00 to 51.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	54.00 to 55.00
Locomotive tires, cut	48.00 to 49.00
Cut bolsters & side frames	47.00 to 48.00
Angles and splice bars	49.00 to 50.00
RR. steel car axles	53.00 to 55.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	44.00 to 46.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	37.00 to 38.00
Cast iron brake shoes	37.00 to 38.00
Cast iron car wheels	42.00 to 44.00
Malleable	42.00 to 43.00
Stove plate	35.00 to 36.00

## Philadelphia Area

No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	33.50 to 34.50
Machine shop turn.	26.50 to 27.50
Mixed bor., short turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	38.50 to 39.00
Low phos. 5 ft and under	44.00 to 45.00
Low phos. 2 ft and under	46.00 to 47.00
Low phos. punchings	46.00 to 47.00
Elec. furnace bundles	45.00 to 46.00
Heavy turnings	42.00 to 43.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	55.00 to 56.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	41.00 to 42.00
Cast iron carwheels	46.00 to 47.00
Malleable	46.00 to 47.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	45.00 to 46.00
Charging box cast.	39.00 to 40.00

## Cleveland

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. 2 ft and under	46.00 to 47.00
Drop forge flashings	41.00 to 42.00
No. 1 RR. hvy. melting	47.00 to 48.00
Rails 3 ft and under	53.00 to 54.00
Rails 18 in. and under	55.00 to 56.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	38.00 to 39.00
Railroad cast	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00
Stove plate	44.00 to 45.00
Malleable	48.00 to 49.00

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Youngstown

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. plate	48.00 to 49.00

## Buffalo

No. 1 hvy. melting	\$40.50 to \$41.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 busheling	40.00 to 40.50
No. 1 bundles	40.50 to 41.50
No. 2 bundles	36.00 to 36.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	29.00 to 29.50
Shoveling turnings	30.00 to 30.50
Cast iron borings	29.00 to 29.50
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	46.75 to 46.75
Rails 2 ft and under	51.75 to 52.75
RR. steel wheels	50.50 to 51.50
RR. spring steel	50.75 to 51.75
RR. couplers and knuckles	50.50 to 51.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

## Detroit

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles, openhearth	37.00 to 38.00
No. 2 bundles	30.00 to 31.00
New busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Electric furnace, bundles	38.00 to 39.00
Low phos. punch'gs, plate	38.00 to 39.00
No. 1 cupola cast	43.00
Heavy breakable cast.	34.00
Stove plate	34.00
Automotive cast.	43.00

## St. Louis

No. 1 hvy. melting	\$40.00 to \$42.00
No. 2 hvy. melting	36.00 to 38.00
No. 2 bundled sheets	33.00 to 34.00
Machine shop turn.	17.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	12.00 to 14.00
Rails, random lengths	48.00 to 50.00
Rails 18 in. and under	52.00 to 54.00
Locomotive tires, uncut	43.00 to 44.00
Angles and splice bars	47.00 to 48.00
Std. steel car axles	53.00 to 54.00
RR. spring steel	45.00 to 47.00
Cupola cast.	41.00 to 42.00
Hvy. breakable cast.	36.00 to 38.00
Cast iron brake shoes	39.00 to 40.00
Stove plate	35.00 to 36.00
Cast iron car wheels	43.00 to 44.00
Malleable	38.00 to 39.00
Unstripped motor blocks	34.00 to 35.00

## New York

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$36.00 to \$37.50
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundles	28.00 to 29.00
Low phos. 2 ft and less.	39.50 to 40.50
Machine shop turn.	19.50 to 20.50
Mixed bor. and turn	19.50 to 20.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast.	42.00 to 43.00
Mixed yard cast.	33.00 to 34.00
Charging box cast.	34.00 to 35.00
Heavy breakable cast.	34.00 to 35.00
Unstripped motor blocks	22.00 to 23.00

## Birmingham

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	29.50 to 30.50
Machine shop turn.	20.75 to 21.75
Shoveling turnings	22.75 to 23.75
Cast iron borings	22.75 to 23.75
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	45.00 to 46.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	45.00 to 46.00
Std. steel axles	45.00 to 46.00
No. 1 cupola cast	39.00 to 40.00
Stove plate	35.00 to 36.00
Cast iron car wheels	46.00 to 47.00
Charging box cast.	30.00 to 31.00
Heavy breakable	30.00 to 31.00
Unstripped motor blocks	32.00 to 33.00
Mashed tin cans	17.00 to 18.00

## Boston

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	32.50 to 33.00
No. 2 bundles	27.50 to 28.00
No. 1 busheling	32.50 to 33.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Machine shop turn.	17.00 to 18.00
Mixer bor. and short turn.	21.00
Shoveling turnings	21.00
Clean cast chem. borings	28.17
No. 1 machinery cast	30.00 to 31.00
Mixed cupola cast.	26.00 to 28.00
Heavy breakable cast.	28.00 to 30.00
Stove plate	27.00
Unstripped motor blocks	22.00

## Cincinnati

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Low phos. 18 in. & under	46.00 to 47.00
Rails, random lengths	44.00 to 45.00
Rails, 18 in. and under	52.00 to 53.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	48.00 to 49.00

## San Francisco

No. 1 hvy. melting	\$28.00
No. 2 hvy. melting	24.00
No. 1 bundles	25.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Machine shop turn.	10.00
Cast iron borings	15.00
No. 1 RR. hvy. melting	28.00
No. 1 cupola cast.	\$38.00 to 39.00

## Los Angeles

No. 1 hvy. melting	\$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
No. 3 bundles	16.00
Mach. shop turn.	8.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. fur. 1 ft and under	29.00
No. 1 RR. hvy. melting	24.00
No. 1 cupola cast.	\$36.00 to 38.00

## Seattle

No. 1 hvy. melting	\$31.00
No. 2 hvy. melting	27.00
No. 1 bundles	28.00
No. 2 bundles	23.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

## Hamilton Ont.

No. 1 hvy. melting	\$32.00
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Bushellings	27.50
Bush., new fact. prep'd.	30.50
Bush., new fact. unprep'd.	29.50
Short steel turnings	26.50
Mixed bor. and turn.	26.50
Rails, remelting	32.50
Rails, rerolling	41.80
Cast scrap	50.00

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Take this husky Ohio Bolted Magnet, for instance. Heavy-duty strap-wound copper coils are protected by longer-lasting inorganic insulation carefully sealed with non-remelting or asphaltum compound.

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**OHIO WELDED MAGNETS.** 39 to 65" diameter. Lightweight models in 39 & 45". 6-coil types in 46, 55, 65"; 8-coil in 55 & 65". Weld on top where it can't get dented in. Also capsule coil over 45".



**OHIO BASKET MAGNETS.** 55 & 65" 4-coil, & 65" 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45".





## Comparison of Prices

(Effective July 7, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	July 7 1953	June 30 1953	June 9 1953	July 8 1952
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	3.925¢	3.925¢	3.775¢	3.60¢
Cold-rolled sheets	4.775	4.775	4.575	4.35
Galvanized sheets (10 ga.)	5.275	5.275	5.075	4.80
Hot-rolled strip	3.925	3.925	3.725	3.50
Cold-rolled strip	5.575	5.575*	5.20	4.75
Plate	4.10	4.10	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Stainl's C-R strip (No. 302)	41.50	41.50	39.75	36.75
<b>Tin and Terneplate: (per base box)</b>				
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
<b>Bars and Shapes: (per pound)</b>				
Merchant bars	4.15¢	4.15¢	3.95¢	3.70¢
Cold finished bars	5.20	5.20	4.925	4.55
Alloy bars	4.875	4.875	4.675	4.30
Structural shapes	4.10	4.10	3.85	3.65
Stainless bars (No. 302)	35.50	35.50	34.00	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
<b>Wire: (per pound)</b>				
Bright wire	5.525¢	5.525¢	5.225¢	4.85¢
<b>Rails: (per 100 lb.)</b>				
Heavy rails	\$4.325	\$4.325	\$4.075	\$3.60
Light rails	5.20	5.20	5.00	4.90
<b>Semifinished Steel: (per net ton)</b>				
Re-rolling billets	\$62.00	\$62.00	\$59.00	\$56.00
Slabs, re-rolling	62.00	62.00	59.00	56.00
Forging billets	75.50	75.50	70.50	66.00
Alloy blooms, billets, slabs	82.00	82.00	76.00	70.00
<b>Wire Rod and Skelp: (per pound)</b>				
Wire rods	4.525¢	4.525¢	4.325¢	4.10¢
Skelp	3.75	3.75	3.55	3.35
<b>Finished Steel Composite: (per pound)</b>				
Base price	4.634¢	4.634¢*	4.417¢	4.131¢

\* Revised.

### Pig Iron: (per gross ton)

	July 7 1953	June 30 1953	June 9 1953	July 8 1952
Foundry, del'd Phila.	\$62.19	\$60.69	\$60.69	\$58.19
Foundry, Valley	56.50	55.75	55.00	52.50
Foundry, Southern, Cin'ti	60.43	59.43	58.93	55.58
Foundry, Birmingham	52.88	51.88	51.38	48.88
Foundry, Chicago†	56.50	56.50	55.00	52.50
Basic del'd Philadelphia	61.27	59.77	59.77	57.27
Basic, Valley furnace	56.00	55.25	54.50	52.00
Malleable, Chicago†	56.50	56.50	55.00	52.50
Malleable, Valley	56.50	55.75	55.00	52.50
Ferromanganese, cents per lb.	10.00¢	10.00¢	9.92¢	8.96¢

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages, 76 pct Mn basis.

### Pig Iron Composite: (per gross ton)

	July 7 1953	June 30 1953	June 9 1953	July 8 1952
Pig iron	\$56.76	\$56.01	\$55.26	\$52.77
<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	\$45.50	\$45.50	\$40.50	\$39.50
No. 1 steel, Phila. area	43.50	43.50	40.50	40.50
No. 1 steel, Chicago	42.50	41.50	38.50	38.50
No. 1 bundles, Detroit	37.50	37.50	37.50	41.15*
Low phos., Youngstown	48.50	47.50	46.50	45.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	49.50	52.00†
No. 1 mach'y cast, Philadel'a.	45.50	45.50	47.50	52.00†
No. 1 mach'y cast, Chicago	45.00	44.50	43.00	41.50

\* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

<b>Scrap Steel Composite: (per gross ton)</b>				
No. 1 heavy melting scrap	\$43.83	\$43.50	\$39.83	\$39.50
<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$14.75	\$14.75	\$14.75	\$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	29.875¢	29.875¢	29.875¢	24.60
Copper, Lake, Conn.	30.125	30.125	...	24.625
Tin, straits, New York	84.75¢	90.50	91.75	\$1.21½
Zinc, East St. Louis	11.00	11.00	11.00	15.00
Lead, St. Louis	13.30	13.30	13.05	15.80
Aluminum, virgin ingot	20.50	20.50	20.50	19.00
Nickel, electrolytic	63.08	63.08	63.08	69.58
Magnesium, ingot	27.00	27.00	27.00	24.60
Antimony, Laredo, Tex.	34.50	34.50	34.50	39.00

† Tentative. ‡ Average. \* Revised.

## Composite Price Notes

### Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

### Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

### Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

## Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1) 500 to 1499 lb. (2) 20,000 lb or over. (3) 450 to 1499 lb. (4) 500 to 9999 lb.

WARE- HOUSES			Base price, f.o.b., dollars per 100 lb.													
			Sheets			Strip		Plates	Shapes	Bars		Alloy Bars				
Cities	City Delivery Charge	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold- Finished	Hot-Rolled A 4615 As Rolled	Hot-Rolled A 4110 Annealed	Cold-Drawn A 4615 As Rolled	Cold-Drawn A 4110 Annealed		
Baltimore	\$.20	5.96 6.00	7.25 7.35	7.38	6.68		6.55	6.59	6.56	7.64						
Birmingham	.15	6.10	7.00	8.00 <sup>4</sup>	6.30		6.35	6.35	6.15	8.90						
Boston	.20	6.66	7.54	8.39- 8.93	6.81	9.00 <sup>2</sup>	6.83- 6.88	6.68	6.57	7.82	11.98	11.79- 11.98		14.28		
Buffalo	.20	5.95	6.85	8.70- 8.71	6.30- 6.47		6.35- 6.38	6.15- 6.20	5.95- 6.05	7.15		11.60- 11.85		13.90- 14.15		
Chicago	.20	6.18	7.12	8.05	6.42		6.33- 6.38	6.46	6.28	7.30						
Cincinnati	.20	6.28	6.89	8.17	6.40		6.55	6.54	6.28	7.38		11.87		14.17		
Cleveland	.20	5.95 5.96	6.82 6.83	7.95 8.04	6.27		6.25	6.40	6.04	7.10		10.79- 11.59	12.79- 13.89			
Denver		7.70	8.55- 9.15	9.79- 10.25	7.60		7.55	7.55	7.60	8.80			15.25			
Detroit	.20	6.15- 6.22	7.00- 7.02	8.04- 8.59	6.39- 6.50	7.05- 7.67	6.55- 6.57	6.54- 6.27	7.32	11.97	11.57- 11.82	14.02	12.82			
Houston	.20	6.75- 6.90	7.00- 7.73	8.62- 9.20	6.95- 7.16		6.75- 6.86	6.80- 6.95	9.55	13.15	12.65	14.65	14.40	14.90		
Kansas City	.20	6.62	7.46- 7.49	8.42	6.77		6.75	6.74	6.65	7.80		11.87				
Los Angeles	.20	7.05	8.70- 8.90	8.45- 8.90	7.05- 7.20	10.10- 10.85	6.90	6.75- 6.80	6.85- 6.95	9.40- 10.10	12.45- 13.00	11.95- 12.75	14.50- 15.30	14.55- 15.55		
Memphis	.10	6.56	7.40- 7.50		6.60- 6.98		6.71	6.71- 6.98	6.57- 6.83	7.52- 7.98						
Milwaukee	.20	6.35	7.29	8.22	6.59		6.50- 6.55	6.63	6.45	7.57- 7.58						
New Orleans	.15	6.28	7.12	8.48	6.32	8.13	6.43	6.43	6.31	8.05						
New York	.30	6.54- 6.77	7.45- 7.59	8.72	6.72- 6.82		6.67	6.50	6.75	7.90	12.00	11.84	14.03	14.14		
Norfolk	.20	6.75			7.00		6.95	6.95	7.00	8.50						
Philadelphia	.25	6.30- 5.96	7.13- 7.85	7.53- 8.00	6.70- 6.23	5.80	6.30	6.30	6.57- 6.58	7.66	11.74	11.59		13.89		
Pittsburgh	.20	5.95 5.96	6.82 6.82	8.30 8.30	6.20 6.23		6.03	6.07	5.98	7.12		11.45		13.75		
Portland	.20	7.80- 8.55	9.05- 9.50	9.30- 9.50	7.50- 7.60		7.05	7.25	7.25	9.40						
Salt Lake City	.20	8.30- 8.80		10.80 <sup>3</sup> - 11.30	8.45- 8.55		7.85	8.00	8.40	11.25						
San Francisco	.15	7.35	8.70	9.90	7.60	10.35	7.20	7.25	7.15	9.85	13.55	12.80	15.50	15.55- 15.80		
Seattle	.20	8.15	8.70	10.10	8.02		9.59	7.35	7.58	10.13		13.20		15.50		
St. Louis	.20	6.48	7.42	8.35	6.72		6.73	6.86	6.58	7.70						
St. Paul	.15	6.47 6.67	7.48	8.41- 8.56	6.77		6.69	6.73	6.64	7.78		11.86				



## how to get quality —in alloy steels

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*Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Max-el Machinery, Onyx Spring and Special Purpose Steels.*

# CRUCIBLE

first name in special purpose steels

53 years of *Fine* steelmaking

## WAREHOUSE SERVICE

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July 2, 1953

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**STEEL  
PRICES**(Effective  
July 7, 1953)

	INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL- ING	SHAPES STRUCTURALS		STRIP			
	Carbon Forging Net Ton	Alloy Net Ton	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.				\$82.00 B3			4.15 B3	6.20 B3				
	Buffalo, N. Y.		\$62.00 B3	\$75.50 B3, R3	\$82.00 B3		4.925 B3	4.15 B3	6.20 B3	3.925 B3, R3	5.45 B3	6.00 B3	8.425 B3
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.									4.325 A2		6.20 A2	
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.		\$62.00 B3	\$75.50 B3	\$82.00 B3			4.15 B3	6.20 B3				
	Newark, N. J.												
	New Haven, Conn.										5.95 A5 6.20 D1		
	Phoenixville, Pa.												
	Putnam, Conn.												
	Sparrow Pt., Md.									3.925 B3	5.45 B3	6.00 B3	8.425 B3
	Worcester, Mass.												
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.												
	Ashland, Ky.									3.925 A7			
	Canton-Massillon, Ohio			\$75.50 R3									
	Chicago, Ill.		\$62.00 U1	\$75.50 R3, U1, W8	\$82.00 U1, W8, R3		4.925 U1	4.10 U1, W8	6.175 U1	3.925 A1, W8	5.95 A1	5.95 R3	
	Sterling, Ill.												
	Cleveland, Ohio			\$75.50 R3							5.45 A5, J3		7.80 J3
	Detroit, Mich.	\$63.00 R5		\$78.50 R5	\$85.00 R5					4.225 G3	5.45 G3 5.95 D1 6.05 D2	6.50 G3	7.90 D2 8.50 G3
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana		\$62.00 U1	\$75.50 U1	\$82.00 U1, Y1		4.925 J3	4.10 J3, U1	6.175 U1, J3	3.925 J3, U1, Y1	5.70 J3	5.95 U1, J3 6.45 Y1	
	Granite City, Ill.												
	Kokomo, Ind.										5.45 A7		
	Middletown, Ohio												
	Niles, Ohio Sharon, Pa.									4.225 S1	5.80 S1	5.95 S1	7.65 S1
	Pittsburgh, Pa. Midland, Pa.	\$59.00 U1	\$62.00 U1	\$62.00 U1 \$62.50 J3	\$75.50 J3, U1	\$82.00 U1	3.75 U1 3.85 J3	4.925 U1	4.10 J3, U1	6.175 J3, U1	4.425 S7, S9	5.45 B4, J3 6.15 S7	7.80 J3
	Portsmouth, Ohio												
	Weirton, Wheeling, Follansbee, W. Va.							4.35 W3		4.025 W3	5.45 F3, W3	6.30 W3	
	Youngstown, Ohio				\$82.00 Y1		3.75 R3, U1	4.10 Y1		3.925 R3, U1, Y1	5.45 R3, Y1	5.95 U1 6.45 Y1	8.30 Y1
WEST	Fontana, Cal.	\$86.00 K1	\$88.00 K1	\$81.00 K1	\$94.50 K1	\$101.00 K1		4.75 K1	6.825 K1	4.70 K1	7.35 K1	7.05 K1	
	Geneseo, Utah				\$75.50 C7			4.10 C7	6.175 C7				
	Kansas City, Mo.							4.80 S2		4.625 S2		7.10 S2	
	Los Angeles, Torrance, Cal.				\$94.50 B2	\$102.00 B2		4.80 B2, C7	6.85 B2	4.675 B2, C7			
	Minnequa, Colo.												
	San Francisco, Niles, Pittsburg, Cal.				\$94.50 B2			4.75 B2 4.91 P9	6.80 B2	4.675 B2, C7			
	Seattle, Wash.				\$94.50 B2, S11			4.85 B2	6.90 B2				
SOUTH	Atlanta, Ga.									4.475 A8			
	Fairfield, Ala. Alabama City, Ala.			\$62.00 T2	\$75.50 T2			4.10 R3, T2	6.175 T2	3.925 R3, T2		5.95 T2	
	Houston, Texas				\$85.50 S2	\$92.00 S2		4.60 S2		4.425 S2			



*Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.*

IRON AGE

**SHEETS**

**WIRE  
ROD**

**TINPLATE†**

**BLACK  
PLATE**

**STEEL  
PRICES**

(Effective  
July 7, 1953)

Hot-rolled 18 ga. & heavy.	Cold- rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terns 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
3.925 B3	4.775 B3				5.90 B3	7.225 B3			4.525 W6				Bethlehem, Pa.
													Buffalo, N. Y.
													Claymont, Del.
													Coatesville, Pa.
4.325 A2					6.15 A2								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.525 B3				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
4.025 U1	4.875 U1									\$8.80 U1	\$7.50 U1	6.60 U1	Morrisville, Pa.
3.925 B3	4.775 B3	5.275 B3			5.90 B3	7.225 B3	8.075 B3		4.625 B3	\$8.80 B3	\$7.50 B3		Sparrow Pt., Md.
									4.825 A5				Worcester, Mass.
													Trenton, N. J.
3.925 A7		5.275 A7	5.175 A7										Alton, Ill.
		5.275 R3											Ashland, Ky.
3.925 A1, W8					5.90 U1				4.525 A5, N4				Canton-Massillon, Ohio
									4.625 N4				Chicago, Ill.
3.925 J3, R3	4.775 J3, R3		5.175 R3		5.90 J3	7.225 J3			4.525 A5				Sterling, Ill.
4.125 G3	4.975 G3				6.375 G3	7.675 G3							Cleveland, Ohio
													Detroit, Mich.
													Duluth, Minn.
3.925 I3, U1, Y1	4.775 I3, U1, Y1	5.275 U1 5.325 I3	5.175 I3, U1	5.675 U1	5.90 U1, I3 6.40 Y1	7.225 U1 7.725 Y1				\$8.70 I3, U1, Y1	\$7.40 I3, U1	6.10 U1, Y1	Gary, Ind. Harbor, Indiana
		5.475 G2	5.875 G2								\$7.60 G2	6.30 G2	Granite City, Ill.
		5.375 C9											Kokomo, Ind.
	4.775 A7		5.175 A7	5.675 A7									Middletown, Ohio
4.225 S1				5.45 S1	5.90 S1						\$7.40 R3		Niles, Ohio
3.925 J3, U1	4.775 J3, U1	5.275 U1	5.175 U1		5.90 J3, U1	7.225 J3, U1	7.925 U1		4.525 A5	\$8.70 J3, U1	\$7.40 J3, U1	6.10 U1	Sharon, Pa.
	5.775 D1							4.725 D1					Pittsburgh, Pa. Midland, Pa.
3.925 W3, W5	4.775 W3, W5	5.275 W3, W5		5.675 W3, W5		7.475 W3				\$8.70 W3, W5	\$7.40 W3, W5	6.55 W5	Portsmouth, Ohio
3.925 R3, U1, Y1	4.775 R3, Y1				5.90 U1, R3 6.40 Y1	7.225 R3 7.725 Y1			4.525 Y1	\$8.70 R3			Weirton, Wheeling, Follansbee, W. Va.
4.70 K1	5.875 K1				7.00 K1	8.275 K1			5.325 K1				Youngstown, Ohio
4.025 C7													Fontana, Cal.
													Geneva, Utah
4.625 C7		6.025 C7						5.325 B2					Kansas City, Mo.
													Los Angeles, Torrance, Cal.
4.625 C7	5.725 C7	6.025 C7							5.175 C7	\$9.45 C7	\$8.15 C7		Minnequa, Colo.
													San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
3.925 R3, T2	4.775 T2	5.275 R3, T2			5.90 T2			5.125 T2	4.525 T2	\$8.80 T2	\$7.50 T2		Atlanta, Ga.
													Fairfield, Ala.
													Alabama City, Ala.
													Houston, Texas

**STEEL PRICES**

(Effective July 7, 1953)

STEEL PRICES (Effective July 7, 1953)		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg.'s. Bright
EAST	Bethlehem, Pa.				4.875 B3	6.275 B3	6.225 B3					
	Buffalo, N. Y.	4.15 B3,R3	4.15 B3		4.875 B3, R3	6.275 B3	6.225 B3	4.10 B3			6.25 B3	5.525 W6
	Claymont, Del.											
	Coatesville, Pa.							4.35 L4		5.75 L4		
	Conschocken, Pa.							4.55 A2	5.15 A2		6.50 A2	
	Harrisburg, Pa.											
	Hartford, Conn.			5.85 R3		6.775 R3						
	Johans town, Pa.	4.15 B3	4.15 B3		4.875 B3		6.225 B3	4.10 B3		5.55 B3	6.25 B3	5.525 B3
	Newark, N. J.			5.70 W10		6.65 W10						
	New Haven, Conn.											
	Camden, N. J.											
	Putnam, Conn.			5.85 W10								
	Sparrows Pt., Md.		4.15 B3					4.10 B3		5.55 B3	6.25 B3	5.625 B3
	Palmer, Worcester, Mass.											5.825 A5, W6
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.											
	Ashland, Ky.							4.10 A7				
	Canton-Massillon, Ohio	4.15 R3		5.20 R2, R3	4.875 R3	6.325 R2, R3						
	Chicago, Ill.	4.15 R3, U1, W8	4.15 R3, 4.90 N4	5.20 A5,W10, W8, L2, B5	4.875 U1, W8, R3	6.325 A5,W8, W10, L2, R3, B5		4.10 U1,W8	5.15 U1	5.55 U1	6.25 U1	5.525 A5, R3, N4, 5.625 W7
	Cleveland, Ohio	4.15 R3	4.15 R3	5.20 A5,C13		6.325 A5,C13		4.10 J3,R3			6.25 J3	5.525 A5, R3, C13
	Detroit, Mich.	4.30 R5, 4.50 G3		5.35 R5, P8	5.025 R5, 5.225 G3	6.475 R5, P8	6.875 G3	4.65 G3			7.10 G3	
	Duluth, Minn.											5.525 A5
	Gary Ind. Harbor, Crawfordville, Indiana	4.15 I3, U1, Y1	4.15 I3, U1, Y1	5.20 R3	4.875 I3, U1, Y1	6.325 R3, M5	6.225 U1, I3, 6.725 Y1	4.10 I3, U1, Y1	5.15 I3	5.55 U1	6.25 U1, I3, 6.75 Y1	5.625 M4
	Granite City, Ill.											
	Kokomo, Ind.											5.625 C9
	Sterling, Ill.	4.75 N4	5.00 N4									5.825 N4
	Niles, Ohio Sharon, Pa.							4.10 S1		5.70 S1	6.25 S1	
	Pittsburgh, Pa. Midland, Pa.	4.15 J3, U1	4.15 J3, U1	5.20 A5, J3, W10, R3	4.875 U1	6.325 A5, W10	6.225 J3, U1	4.10 J3, U1	5.15 U1	5.55 U1	6.25 J3, U1	5.525 A5, J3
	Portsmouth, Ohio											5.725 D1
	Weirton, Wheeling, Follansbee, W. Va.	4.30 W3						4.40 W3				
Youngstown, Ohio	4.15 R3, U1, Y1	4.15 R3, U1, Y1	5.20 Y1	4.875 U1, Y1		6.225 U1, 6.725 Y1	4.10 R3, U1, Y1			6.75 Y1	5.525 Y1	
WEST	Fontana, Cal.	4.85 K1	4.85 K1		5.925 K1		7.475 K1	4.75 K1		6.60 K1	6.95 K1	
	Geneva, Utah							4.10 C7			6.25 C7	
	Kansas City, Mo.	4.85 S2	4.85 S2		5.755 S2						5.825 S2	
	Los Angeles, Torrance, Cal.	4.85 B2,C7	4.85 B2,C7	6.65 R3	5.925 B2		6.925 B2					
	Minnequa, Colo.											
	San Francisco, Niles, Pittsburg, Cal.	4.85 C7,P9, 4.90 B2	4.85 C7,P9, 4.90 B2				6.975 B2					6.475 C7
	Seattle, Wash.	4.90 B2	4.90 B2,S11				6.975 B2	5.00 B2			7.15 B2	
SOUTH	Atlanta, Ga.	4.45 A8	4.45 A8									5.775 A8
	Fairfield, Ala. Alabama City, Ala.	4.15 R3,T2	4.15 R3,T2				6.225 T2	4.10 R3,T2			6.25 T2	5.525 R3, T2
	Houston, Texas Ft. Worth, Texas	4.65 S2	4.65 S2		5.375 S2			4.60 S2				

# Steel Prices

(Effective July 7, 1953)

## Key to Steel Producers

With Principal Offices

- Acme Steel Co., Chicago  
 A2 Alan Wood Steel Co., Conshohocken, Pa.  
 A3 Allegheny Ludlum Steel Corp., Pittsburgh  
 A4 American Cladmetals Co., Carnegie, Pa.  
 A5 American Steel & Wire Div., Cleveland  
 A6 Angell Nail & Chaplet Co., Cleveland  
 A7 Armco Steel Corp., Middletown, O.  
 A8 Atlantic Steel Co., Atlanta, Ga.  
 B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco  
 B3 Bethlehem Steel Co., Bethlehem, Pa.  
 B4 Blair Strip Steel Co., New Castle, Pa.  
 B5 Bliss & Laughlin, Inc., Harvey, Ill.  
 C1 Calstrip Steel Corp., Los Angeles  
 C2 Carpenter Steel Co., Reading, Pa.  
 C3 Central Iron & Steel Co., Harrisburg, Pa.  
 C4 Claymont Products Dept., Claymont, Del.  
 C5 Cold Metal Products Co., Youngstown  
 C6 Colorado Fuel & Iron Corp., Denver  
 C7 Columbia-Geneva Steel Div., San Francisco  
 C8 Columbia Steel & Shifting Co., Pittsburgh  
 C9 Continental Steel Corp., Kokomo, Ind.  
 C10 Copperweld Steel Co., Glassport, Pa.  
 C11 Crucible Steel Co. of America, New York  
 C12 Cumberland Steel Co., Cumberland, Md.  
 C13 Cuyahoga Steel & Wire Co., Cleveland  
 D1 Detroit Steel Corp., Detroit  
 D2 Detroit Tube & Steel Div., Detroit  
 D3 Driver Harris Co., Harrison, N. J.  
 D4 Dickson Weatherproof Nail Co., Evanston, Ill.  
 E1 Eastern Stainless Steel Corp., Baltimore  
 E2 Empire Steel Co., Mansfield, O.  
 F1 Firth Sterling, Inc., McKeesport, Pa.  
 F2 Fitzsimons Steel Corp., Youngstown  
 F3 Follansbee Steel Corp., Follansbee, W. Va.  
 G1 Globe Iron Co., Jackson, O.  
 G2 Granite City Steel Co., Granite City, Ill.  
 G3 Great Lakes Steel Corp., Detroit  
 H1 Hanna Furnace Corp., Detroit  
 I2 Ingersoll Steel Div., Chicago  
 I3 Inland Steel Co., Chicago  
 I4 Interlake Iron Corp., Cleveland  
 J1 Jackson Iron & Steel Co., Jackson, O.  
 J2 Jesop Steel Corp., Washington, Pa.  
 J3 Jones & Laughlin Steel Corp., Pittsburgh  
 J4 Joslyn Mfg. & Supply Co., Chicago  
 K1 Kaiser Steel Corp., Fontana, Cal.  
 K2 Keystone Steel & Wire Co., Peoria  
 K3 Koppers Co., Granite City, Ill.  
 L1 Laclede Steel Co., St. Louis  
 L2 La Salle Steel Co., Chicago  
 L3 Lone Star Steel Co., Dallas  
 L4 Lukens Steel Co., Coatesville, Pa.  
 M1 Mahoning Valley Steel Co., Niles, O.  
 M2 McLouth Steel Corp., Detroit  
 M3 Mercer Tube & Mfg. Co., Sharon, Pa.  
 M4 Mid-States Steel & Wire Co., Crawfordville, Ind.  
 M5 Monarch Steel Co., Inc., Hammond, Ind.  
 M6 Mystic Iron Works, Everett, Mass.  
 N1 National Supply Co., Pittsburgh  
 N2 National Tube Co., Pittsburgh  
 N3 Niles Rolling Mills Co., Niles, O.  
 N4 Northwestern Steel & Wire Co., Sterling, Ill.  
 N5 Newport Steel Corp., Newport, Ky.  
 O1 Oliver Iron & Steel Co., Pittsburgh  
 P1 Page Steel & Wire Div., Monessen, Pa.  
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.  
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.  
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh  
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh

- P6 Pittsburgh Steel Co., Pittsburgh  
 P7 Portsmouth Div., Detroit Steel Corp., Detroit  
 P8 Plymouth Steel Co., Detroit  
 P9 Pacific States Steel Co., Niles, Cal.  
 P10 Precision Drawn Steel Co., Camden, N. J.  
 R1 Reeves Steel & Mfg. Co., Dover, O.  
 R2 Reliance Div. Eaton Mfg. Co., Massillon, O.  
 R3 Republic Steel Corp., Cleveland  
 R4 Roebeling Sons Co. (John A.), Trenton, N. J.  
 R5 Rotary Electric Steel Co., Detroit  
 S1 Sharon Steel Corp., Sharon, Pa.  
 S2 Sheffield Steel Corp., Kansas City  
 S3 Shenango Furnace Co., Pittsburgh  
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.  
 S5 Sloss Sheffield Steel & Iron Co., Birmingham  
 S6 Standard Forging Corp., Chicago  
 S7 Stanley Works, New Britain, Conn.  
 S8 Superior Drawn Steel Co., Monaca, Pa.  
 S9 Superior Steel Corp., Carnegie, Pa.  
 S10 Sweet's Steel Co., Williamsport, Pa.  
 S11 Seidelhuber Steel Rolling Mills, Seattle  
 T1 Tonawanda Iron Div., N. Tonawanda, N. Y.  
 T2 Tennessee Coal & Iron Div., Fairfield  
 T3 Tennessee Products & Chem. Corp., Nashville  
 T4 Thomas Strip Div., Warren, O.  
 T5 Timken Steel & Tube Div., Canton, O.  
 T6 Tremont Nail Co., Wareham, Mass.  
 T7 Texas Steel Co., Fort Worth  
 U1 United States Steel Co., Pittsburgh  
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.  
 W1 Wallingford Steel Co., Wallingford, Conn.  
 W2 Washington Steel Corp., Washington, Pa.  
 W3 Weirton Steel Co., Weirton, W. Va.  
 W4 Wheatland Tube Co., Wheatland, Pa.  
 W5 Wheeling Steel Corp., Wheeling, W. Va.  
 W6 Wickwire Spencer Steel Div., Buffalo  
 W7 Wilson Steel & Wire Co., Chicago  
 W8 Wisconsin Steel Co., S. Chicago, Ill.  
 W9 Woodward Iron Co., Woodward, Ala.  
 W10 Wycoff Steel Co., Pittsburgh  
 Y1 Youngstown Sheet & Tube Co., Youngstown

## MERCHANT WIRE PRODUCTS

	Standard & Coated Nails	Woven Wire Fence 9-15 1/2 ga.	4-1/2" Fence Posts	Single Loop Bale Ties	Twisted Barbed Wire	Galv. Barbed Wire	Merch. Wire Ann'd	Merch. Wire* Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City R3	131	140		140	153	6.675	7.07	
Aliquippa, Pa. J3								
Atlanta A8								
Bartonville K2								
Buffalo W6								
Chicago, Ill. N4	131	143		149	156	6.675	7.225	
Cleveland A6						6.675		
Cleveland A5								
Crawfordsville M4	133	145		151	135	6.775	7.325	
Donora, Pa. A5	131	140		149	153	6.675	7.075	
Duluth A5	131	140	145	149	153	6.675	7.075	
Fairfield, Ala. T2	131	140		149	153	6.675	7.075	
Houston S2								
Johnston, Pa. B3	131	143		158	156	6.675	7.225	
Joliet, Ill. A5	131	140		149	153	6.675	7.075	
Kokomo, Ind. C9	133	142		151	155	6.775	7.175	
Los Angeles B2								
Kansas City S2								
Minneapolis C6								
Monessen P6								
Moline, Ill. R3			140					
Pittsburgh, Cal. C7	150	163		173	173	7.625	8.025	
Portsmouth P7								
Rankin, Pa. A5	131	140		149	153	6.675	7.075	
So. Chicago R3	131	140	140	149	153	6.675	7.075	
S. San Fran. C6								
Sparrows Pt. B3	133			151	158	6.775	7.325	
Struthers, O. Y1								
Worcester A5	137					6.975		
Williamsport, Pa. S10								

Cut Nails, carloads, base \$8.00 per keg (less 20¢ for jobbers), at Conshohocken, Pa. (A2).

\* Alabama City and So. Chicago don't include zinc extra. Galvanized products based on zinc at 11.0¢ per lb.

## STAINLESS STEELS

Base price cents per lb., f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		16.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50-46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25-37.50	37.50	39.75	39.75	59.00	45.75-46.00	51.25	30.00	30.50-31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25		27.00
Strip, cold-rolled	38.25-38.50	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2; (type 316 add 4.5¢) J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Lockport, N. Y., R4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; (type 316 add 4.5¢); W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Lockport, N. Y., S4; Sharon, Pa., S1 (type 301 add 1/4¢); Butler, Pa., A7; Wallingford, Conn., W1.

Bars: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Lockport, N. Y., S4; Canton, O., T5; Ft. Wayne, J4.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Butler, Pa., A7; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Lockport, N. Y., S4; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.



# Miscellaneous Prices

(Effective July 7, 1953)

## PIPE AND TUBING

Base discounts f.o.b. mills. Base price about \$200 per net wt.

	BUTTWELD														SEAMLESS							
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. B3	23.75	8.0	26.75	12.0	29.75	15.5	31.75	16.0	32.75	17.0	33.25	17.5	34.75	18.0								
Youngstown R3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	35.75	20.0								
Fontana K1	13.25	2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0								
Pittsburgh J3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. L1																						
Sharon M3	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Pittsburgh N1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling W5	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Wheeland W4	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Youngstown Y1	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor Y1	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0								
Lorain N2	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. B3	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0								
Youngstown R3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Fontana K1	16.75	2.0	20.75	1.0	22.75	4.5	23.25	5.5	23.75	6.5	24.25	7.0	24.75	7.0								
Pittsburgh J3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. L1																						
Sharon M3	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Pittsburgh N1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling W5	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Wheeland W4	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Youngstown Y1	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor Y1	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0								
Lorain N2	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb. East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/2 in., 3/4 in., and 1 in., 1 pt.; 1 1/4 in., 1 1/2 in., 2 in., 3/4 pt.; 2 1/2 in., 3 in., 1/2 pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.5¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only butt welded and seamless, 2 1/4 pts. higher discount. Plain ends, butt welded and seamless, 3 in. and under, 4 1/2 pts. higher discount. Butt welded jobbers' discount, 5 pt. East St. Louis zinc price now 11.0¢.

## COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.50 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	28.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	23.21
Lone Star, Tex., f.o.b.	18.50

## ELECTRICAL SHEETS

22 Ga. H-R cut length	Armature	Elec.	Motor	Dynamo	Trans. 72	Trans. 65	Trans. 58
F.o.b. Mill Cents Per Lb.							
Beech Bottom W5	8.35	9.60	10.40	10.95	11.50	12.20	
Brackenridge A3	8.35	9.60	10.40	10.95		12.20	
Granite City G2	7.85	8.35	9.60				
Ind. Harbor J3	7.85	8.35	9.60				
Mansfield E2	7.85	8.35	9.60	10.40	10.95		
Newport, Ky. N5	7.85	8.35					
Niles, O. N3	7.85	8.35					
Vandergrift U1	7.85	8.35	9.60	10.40	10.95	11.50	12.20
Warren, O. R3	7.85	8.35	9.60				
Zanesville A7	7.85	8.35	9.60	10.40	10.95	11.50	12.20

## CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	\$110.30 to \$113.80
6 to 24-in., del'd N.Y.	113.50 to 114.50
6 to 24-in. Birmingham	96.50 to 101.00
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$128.00 to \$130.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

## BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13			26.51	31.98
	2 1/2	12			35.70	43.07
	3	12				49.73
	3 1/2	11			48.13	58.06
	4	10			63.92	77.10
National Tube	2	13			32.98	24.88
	2 1/2	12	36.82	44.41	33.50	
	3	12	42.52	51.28	38.60	
	3 1/2	11	49.63	59.87	45.16	
	4	10	65.91	79.50	59.97	
Pittsburgh Steel	2	13				
	2 1/2	12				
	3	12				
	3 1/2	11				
	4	10				

## C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill		CARBON CONTENT				
		0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. S7	6.15	8.00	8.60	10.55	12.85	
Carnegie, Pa. S9		8.00	8.60	10.55	12.85	
Cleveland A5	5.45	7.65	8.60	10.55	12.85	
Detroit D2	6.05	8.25	8.85			
New Castle, Pa. B4	5.80	8.00	8.60			
New Haven, Conn. D1						
Sharon, Pa. S1	5.80	8.00	8.60	10.55	12.85	
Trenton R4		7.95	8.55	10.50	12.80	
Weirton, W. Va. W3	5.80	8.00	8.60	10.55	12.85	
Worcester, Mass. A5	5.75	7.95	8.90	10.85	13.15	
Youngstown C5						

\* Sold on Pittsburgh base.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

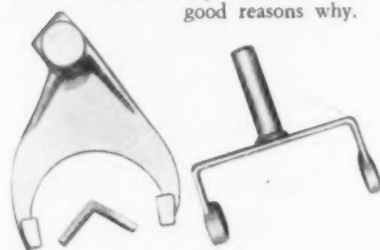
Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery
Bethlehem B3	58.00	58.50	59.00	59.50		
Birmingham R3	52.38	52.88				
Birmingham W9	52.38	52.88				
Birmingham S5	52.38	52.88				
Buffalo R3	56.00	56.50	57.00			
Buffalo H1	56.00	56.50	57.00			68.25
Buffalo W6	56.00	56.50	57.00			
Chicago I4	56.00	56.50	56.50	57.00		
Cleveland A5	56.00	56.50	56.50	57.00	61.00	
Cleveland R3	56.00	56.50	56.50			
Dangerfield, Tex. L3	52.50	52.50	52.50			
Duluth I4	56.00	56.50	56.50	57.00		
Erie I4	56.00	56.50	56.50			
Everett, Mass. M6		63.25	63.75	57.00		
Fontana K1	62.00	62.50				
Geneva, Utah C7	56.00	56.50	56.50	57.00	61.00	
Granite City, Ill. G2	57.90	58.40	58.90			
Hubbard, Ohio Y1	56.00	56.50	56.50			
Jackson, Ohio J1, G1						67.10
Minnequa C6	58.00	59.00	59.00			
Monessen P6	56.00					
Neville Island P4	56.00	56.50	56.50			
Pittsburgh U1	56.00			57.00		
Sharpville S3	56.00	56.50	56.50	57.00		
Steelton B3	58.00	58.50	59.00	59.50	64.00	
Swedeland A2	60.00	60.50	61.00	61.50		
Toledo I4	56.00	56.50	56.50	57.00		
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00	
Youngstown Y1	56.00	56.50	56.50	57.00		
N. Tonawanda, N. Y. T1		56.50	57.00			

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base 1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct; 50¢ per ton for each 0.50 pct manganese over 1 pct; \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over. Silvery Iron: Add \$1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

# Here's why you can rely on **WILLIAMS** for **DROP FORGINGS**



When leading concerns keep coming to WILLIAMS for custom forgings (and they have for over half a century)... you can be very sure there are good reasons why.



## Here are a few:

- Adequate varied equipment to handle complex or simple jobs in short or long runs... efficiently.
- Ability to forge aluminum, brass, bronze, carbon, alloy and stainless steel, titanium and monel in most shapes and in weights up to 250 lbs. (steel).
- Complete heat treating and laboratory facilities... Magnaflex inspection.
- Machining facilities for milling, drilling, turning and broaching... and complete die sinking facilities.
- A reputation for designing, engineering and forging even the toughest jobs to a high degree of accuracy.

Investigate all of the advantages you can receive when you look to Williams for Drop-Forgings. Your inquiry will receive prompt attention.

**Be Wise . . . Buy  
WILLIAMS**

**J. H. WILLIAMS & CO.**

573 Vulcan Street

Buffalo 7, N. Y.

## Miscellaneous Prices

(Effective July 7, 1953)

### RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U1	4.325	5.20	5.275				
Chicago R3				7.05			
Cleveland R3							
Ensley T2	4.325	5.20					
Fairfield T2		5.20				5.125	
Gary U1	4.325	5.20				5.125	
Ind. Harbor J3	4.325		5.275	7.05		5.125	
Johnstown B3		5.20					
Joliet U1		5.20	5.275				
Kansas City S2							
Lackawanna B3	4.325	5.20	5.275			5.125	
Lebanon B3							
Minnequa C6							
Pittsburgh R3							
Pittsburgh O1							
Pittsburgh P5							
Pittsburgh J3							
Pitt'g, Cal. C7						5.275	
Seattle B2						5.275	
Steelton B3	4.325		5.275			5.125	
Struthers Y1						5.275	
Torrance C7							
Youngstown R3							

### TOOL STEEL

F.o.b. mill

Add 4.7 pct to base and extras.

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.50
18	4	1	—	5	\$2.13
18	4	2	—	—	\$1.66
1.5	4	1.5	8	—	\$1.00
6	4	2	6	—	\$6.50
High-carbon chromium					63.50
Oil hardened manganese					350
Special carbon					32.50
Extra carbon					270
Regular carbon					230

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

### CLAD STEEL

Add 4.7 pct to base and extras.

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. L4	*29.5	
Washington, Pa. J2	*29.5	
Claymont, Del. C9	*29.50	
New Castle, Ind. J2	*29.77	*26.24
Nickel-carbon		
10 pct. Coatesville, Pa. L4	32.5	
Inconel-carbon		
10 pct. Coatesville, Pa. L4	40.5	
Monel-carbon		
10 pct. Coatesville, Pa. L4	33.5	
No. 302 Stainless copper stainless, Carnegie, Pa. A4		77.00
Aluminized steel sheets, hot dip, Butler, Pa. A7		7.75

\* Includes annealing and pickling, sandblasting.

### ELECTRODES

Cents per lb. f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
24	84	20.50
18, 20	72	20.00
12, 14	72	20.50
7 to 10	60	21.00
6	60	23.25
4	40	26.00
3	40	27.50
2 1/2	30	28.00
2	24	43.50
CARBON		
40	100, 110	8.95
35	110	8.95
30	110	8.95
24	72 to 84	9.10
20	90	8.95
17	72	9.10
14	72	9.50
10, 12	60	10.30
8	60	10.55

### FLUORSPAR

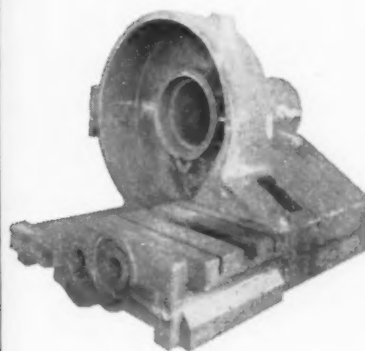
Washed gravel, f.o.b. Roselaitre, Ill.	
1 rice, net ton; Effective CaF <sub>2</sub> content:	
72 1/2%	\$44.00
70% or more	42.50
60% or less	38.00

# Hyde Park



## Gray Iron Castings

Castings of any size up to 80,000 pounds. Hyde Park facilities are equal to your every requirement



Machine Castings  
Lathe Beds  
Housings  
Pinion Housings  
Mill Housings  
Shoe Plates  
Layout Plates  
Surface Plates

# Hyde Park

**FOUNDRY & MACHINE CO.**  
Hyde Park, Westmoreland County, Pa.

ROLLS  
ROLLING MILL MACHINERY  
GREY IRON CASTINGS

# MORE FLEXIBILITY IN YOUR SHOP

Harden, heat treat, temper and anneal with one furnace . . . the Johnson No. 706.

Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7" x 13" x 16½". Also available bench style. Write for complete and factual information.

A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.

598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style . . . . . \$278.00

Bench Style . . . . . \$250.00

Johnson No. 654 Pedestal Style . . . . . \$150.00

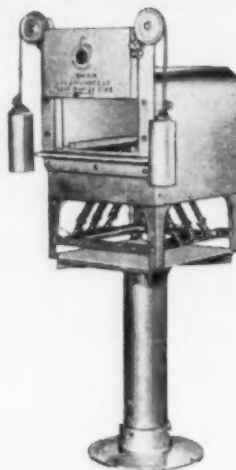
Bench Style . . . . . \$124.00

F.O.B. Factory

# JOHNSON

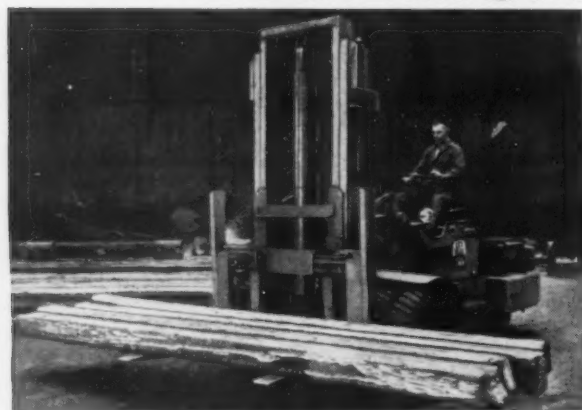
## INDUSTRIAL GAS EQUIPMENT

Furnaces • Burners • Torches • Valves • Mixers • Blowers



Model No. 706

## HEAVY-DUTY FORK LIFTRUK ON THE PRODUCTION LINE!



Here you see a LIFTRUK in The Timken Roller Bearing Company plant, Canton, Ohio, carrying a load of blooms. This is but one of hundreds of important movements required of a LIFTRUK in the metal-production fields.

LIFTRUKS are available in 5 - 7½ - 10 - 15 Ton capacities. Larger sizes to order.

SEND FOR BULLETIN 77

LIFTRUK features = 1—Rugged dead axle for traction wheels. 2—Extra large elevating hydraulic cylinders. 3—Oversize engine clutch. 4—Generous sturdy construction of tiering frames and fork apron—these and other LIFTRUK features assure you of production materials handling and elimination of shut downs or slow ups.

Let our sales engineers give convincing proof of LIFTRUK performance to meet *your* specific needs.

Also available with Boom, Ram, Scoop and other attachments.



## SILENT HOIST & CRANE CO.

851 63rd STREET, BROOKLYN, N. Y., U. S. A.

## Miscellaneous Prices—

(Effective July 7, 1953)

### BOLTS, NUTS, RIVETS, SCREWS

#### Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

#### Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List	Less Keg	K.	Less Keg	K.
		Reg.		Hvy.	
½ in. & smaller	+2	15	+2	18	
9/16 in. & 5/8 in.	+7	11	+32*	+10*	
¾ in. to 1½ in.					
Inclusive . . .	+8	10	+27**	+6**	
1½ in. & larger.	+9	9	+27	+6	
* 9/16 to ¾ in.					
** ¾ to 1½ in.					

#### Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	2	18	+20	net
¾ in. to 1½ in.				
Inclusive . . .	+6	12	+25	+4
1½ in. & larger.	+8	10	+25	+4

#### Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & 5/8 in.	9	24	+2	15
¾ in. to 1½ in.				
Inclusive . . .	+1	16	+9	9
1½ in. & larger	+16	3	+20	net

#### Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	28
9/16 in. & 5/8 in.	18	32	4	20
¾ in. to 1½ in.				
Inclusive . . .	8	23	+8	10
1½ in. & larger.	+14	5	+20	net

#### Light

7/16 in. & smaller	33	43		
½ in. thru ¾ in.	26	37		
¾ in. to 1½ in.				
Inclusive . . .	18	30		

#### Stove Bolts

Packaged, steel, plain finished	44½—10
Packaged, plain finish . . . . .	25½—10
Bulk, plain finish** . . . . .	59*

\*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

\*\*Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

#### Rivets

½ in. & larger . . . . .	Base per 100 lb \$8.90
7/16 in. and smaller . . . . .	Pct Off List 30

#### Cap and Set Screws

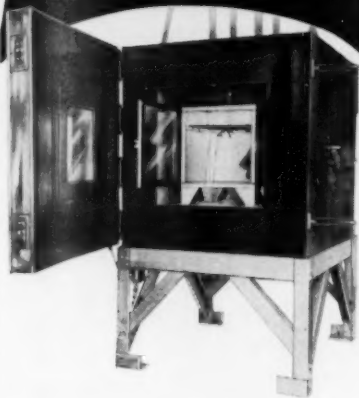
(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ¾ in. x 6 in., SAE 1020, bright . . . . .	40
¾ in. thru 1 in. up to & including 6 in. ¼ in. thru ¾ in. x 6 in. & shorter high C double heat treat . . . . .	26
¾ in. thru 1 in. up to & including 6 in. Milled studs . . . . .	43
Flat head cap screws, listed sizes . . . . .	23
Phillister head cap, listed sizes . . . . .	17
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter . . . . .	12
	7
	37

#### Machine and Carriage Bolts

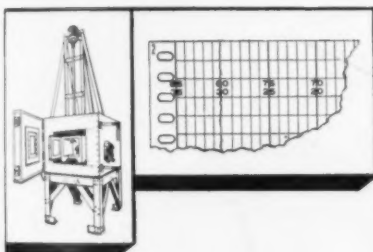
	Pct Off List	Less Case	C.
½ in. & smaller x 6 in. & shorter . . . . .	4	20	
9/16 in. & 5/8 in. x 6 in. & shorter . . . . .	5	21	
¾ in. & larger x 6 in. & shorter . . . . .	3	19	
All diam. longer than 6 in. Lag, all diam. x 6 in. & shorter . . . . .	+4	13	
Lag, all diam. longer than 6 in. . . . .	12	27	
Plow bolts . . . . .	8	23	
	30		



# Another BOWSER First . . . . . the NON-MAGNETIC CHAMBER



The unit produces any temperature from -112° F to 68° F . . . and HOLDS it . . . with temperature control of  $\pm 0.1^\circ$  F.



Stray magnetic fields can be a big headache in the development testing of pure metals. But not in this new chamber engineered by Bowser.

Used in determining effects of temperature on electrical fields, this Bowser non-magnetic chamber does not contain an ounce of steel that could hamper testing. It is constructed entirely of brass, copper, aluminum, rubber, bakelite, glass, wood and Fiberglas. All motors and electrical components are located over 6 feet away to eliminate effects of their electrical fields.

A special inner chamber thermally governed by vernier control is a double guarantee of testing accuracy.

For all your needs in environmental test equipment, be sure to check with Bowser—the pioneer. A field engineer will be glad to discuss your needs (at no obligation).

**BOWSER TECHNICAL REFRIGERATION**

DIVISION BOWSER, INC. TERRYVILLE CONN.

## Miscellaneous Prices

(Effective July 7, 1953)

### REFRACTORIES

**Fire Clay Brick** Carloads, per 1000  
First quality, Ill., Ky., Md., Mo., Ohio, Pa.  
(except Salina, Pa., add \$5.25) \$99.30  
No. 1 Ohio . . . . . 92.40  
Sec. quality, Pa., Md., Ky., Mo., Ill. 92.40  
No. 2 Ohio . . . . . 83.15  
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.60) . . . 14.40

**Silica Brick**  
Mt. Union, Pa., Ensley, Ala. . . . \$99.30  
Childs, Pa. . . . . 103.95  
Hays, Pa. . . . . 105.10  
Chicago District . . . . . 122.40  
Western Utah . . . . . 116.55  
California . . . . . 122.85  
Super Duty, Hays, Pa., Athens, Tex., Chicago . . . . . 116.55  
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) . . . 17.30  
Silica cement, net ton, bulk, Hays, Pa. . . . . 19.60  
Silica cement, net ton, bulk, Ensley, Ala. . . . . 18.45  
Silica cement, net ton, bulk, Chicago District . . . . . 18.45  
Silica cement, net ton, bulk, Utah and Calif. . . . . 25.95

**Chrome Brick** Per net ton  
Standard chemically bonded Balt., Chester . . . . . \$86.00  
Burned, Balt., Chester . . . . . 80.00

**Magnesite Brick**  
Standard Baltimore . . . . . \$109.00  
Chemically bonded, Baltimore . . . 97.50

**Grain Magnesite** St. % in grains  
Domestic, f.o.b. Baltimore  
In bulk fines removed . . . . . \$64.40  
Domestic, f.o.b. Chewelah, Wash.,  
In bulk . . . . . 38.00  
In sacks . . . . . 43.70

**Dead Burned Dolomite**  
F.o.b. producing points in Pennsylvania, West Virginia and Ohio  
per net ton, bulk Midwest, add  
10¢; Missouri Valley, add 20¢ . . \$13.75

### LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953 to end of season.

Gross Ton  
Openhearth lump . . . . . \$11.15  
Old range, bessemer . . . . . 10.30  
Old range, nonbessemer . . . . . 10.15  
Mesabi, bessemer . . . . . 10.05  
Mesabi, nonbessemer . . . . . 9.90  
High phosphorus . . . . . 9.90

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

### METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.  
Swedish sponge iron, c.l.f.  
New York, ocean bags . . . . . 10.9¢  
Canadian sponge iron, del's.  
In East . . . . . 12.0¢  
Domestic sponge iron, 98+%  
Fe, carloads lots . . . . . 15.5¢ to 17.0¢  
Electrolytic iron, annealed,  
99.5+% Fe . . . . . 44.0¢  
Electrolytic iron, unannealed,  
minus 325 mesh, 99+% Fe . . . 60.0¢  
Hydrogen reduced iron, minus  
300 mesh, 98+% Fe . . . 53.0¢ to 80.0¢  
Carbonyl iron, size 5 to 10  
micron, 98%, 99.8+% Fe 83.0¢ to \$1.48  
Aluminum . . . . . 31.5¢  
Brass, 10 ton lots . . . . . 30.00¢ to 33.25¢  
Copper, electrolytic . . . . . 43.50¢  
Copper, reduced . . . . . 43.50¢  
Cadmium, 100-199 lb., 95¢ plus metal value  
Chromium, electrolytic, 99%  
min., and quantity, del'd. . . 33.50  
Lead . . . . . 21.75¢  
Manganese . . . . . 57.0¢  
Molybdenum, 99% . . . . . 32.75¢  
Nickel, unannealed . . . . . 28.0¢  
Nickel, annealed . . . . . 95.0¢  
Nickel, spherical, unannealed . . 92.0¢  
Silicon . . . . . 33.5¢  
Solder powder 7.0¢ to 9.0¢ plus met. value  
Stainless steel, 302 . . . . . 83.9¢  
Stainless steel, 316 . . . . . \$1.10  
Tin . . . . . 14.04¢ plus metal value  
Tungsten, 99% (65 mesh) . . . 55.50¢  
Zinc, 10 ton lots . . . . . 23.0¢ to 30.5¢

## SOLVE YOUR MATERIAL HANDLING PROBLEMS WITH

*Smith*

### DEVICES



#### No. 84 VERTICAL PLATE LIFTING CLAMP

This universally used plate lifting clamp has built its reputation through tough and dependable service. It is designed for jobs where safety and sureness really count. Plates can be lifted to or from horizontal.



#### No. 92 HORIZONTAL PLATE CLAMPS

These clamps are sturdily constructed so as to handle sheet or plate singly or in layers.



#### No. 119 PLATE HOOKS

Excellent light-weight hook for lifting plate, beams, structurals, pipe, etc.

#### No. 85 SET SCREW PLATE GRIPS

This grip maintains a locked hold on plates at all times. Ideal for positioning plates while fabricating.



#### No. 111 BEAM TONGS

Crate, pipe, rail, timber, beam tongs and other tongs, hooks, barrel and drum lifts, etc. manufactured to satisfy a multitude of material handling problems.



VARYING SIZES ON REQUEST

Specified  
by All  
Branches  
of the  
Armed Forces

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**MATERIAL HANDLING**

*devices inc.*

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NAME AND ADDRESS OF OUR NEAREST  
DISTRIBUTOR IN YOUR AREA

# 2

ways  
to make  
crane  
operations  
pay more



### Rud-O-Matic Magnet Reel Tagline Combination

Steel tagline holds magnet steady and absorbs the load . . . protective slack is maintained in expensive magnet cable to avoid jerking, pulling loose at the terminals or snagging.

Standard with major crane manufacturers, made in five sizes for your present equipment.



### Rud-O-Matic Tagline

steadies your clamshell buckets. Provides ample coil spring power at all boom angles to keep bucket lined up with the work. Makes more loads per day easier. Rud-O-Matics are fool-proof, trouble-free. Eight sizes meet all requirements. Available immediately. For full information see your dealer — or mail coupon below.

I'd like more information on ☐ Rud-O-Matic Taglines, ☐ Rud-O-Matic Magnet Reel-Tagline Combinations. Send literature and complete details.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**McCAFFREY-RUDDOCK**  
*Tagline*  
CORPORATION

2131 East 25th Street • Los Angeles 58, California

## Ferroalloy Prices

(Effective July 7, 1953)

### Ferrochrome

Contract prices, cents per pound, contained CR, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C . . .	34.50	0.20% C . . .	33.50
0.10% C . . .	34.00	0.50% C . . .	33.25
0.15% C . . .	33.75	1.00% C . . .	33.00
2.00% C . . .			32.75
65-69% Cr, 4-9% C . . .			24.75
62-66% Cr, 4-6% C, 6-9% Si . . .			25.60

### S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C . . .	
Carloads . . .	25.85
Ton lots . . .	28.00
Less ton lots . . .	29.50

### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

### Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C . . .	\$1.18
0.50% max. C . . .	1.14
9 to 11% C . . .	1.11

### Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)

Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 25.90¢ per lb contained Cr plus 12.60¢ per lb contained Si

### Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Cr, 60-65% Si, 3.00% max. Fe	
Carloads . . .	19.00
Ton lots . . .	22.10
Less ton lots . . .	23.60

### Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si . . .	
Carloads . . .	20.00
Ton lots . . .	22.30
Less ton lots . . .	23.30

### CM5Z

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots . . . 20.75

Less ton lots . . . 22.00

### SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 26% Fe ½ in. x 12 mesh.

Ton lots . . . 17.50

Less ton lots . . . 19.50

### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 4-11% Mn.

Ton lots . . . 16.50

Less ton lots . . . 17.75

### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed . . . 17.50

Ton lots to carload packed . . . 18.50

Less ton lots . . . 20.00

### Ferromanganese

Maximum contract base price, f.o.b. lump size:

Producing Point Base Mn Content per lb (Contained Mn)

Niagara Falls, Alloy, 76-80% 13.15

Ashtabula . . . (Per lb of alloy)

Etna, Clairton, Pa. . . 74-76% 10.00

Johnstown, Pa. . . 74-76% 10.00

Sheridan, Pa. . . 74-76% 10.00

Add or subtract 0.1¢ for each 1% Mn above or below base content.

Briquets—delivered, 66 pct. Mn.

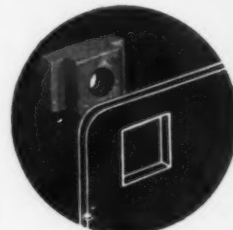
Carload, bulk . . . 12.50

Ton lots, packed . . . 14.05

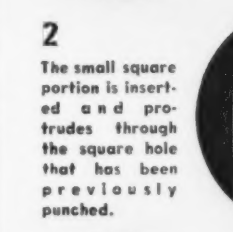
# Fast-On

## CLINCH NUTS

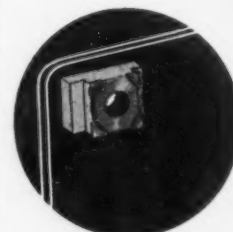
**F**ABRI-STEEL "Fast On" clinch nuts increase thread area and use of lighter gage metal. They cut assembly, using shorter screws and speeding up assembly. Our engineers can help you improve your product. Send for detailed data sheets.



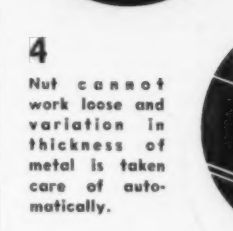
**1**  
The square shape simplifies installation.



**2**  
The small square portion is inserted and protrudes through the square hole that has been previously punched.



**3**  
The protruding portion is now clinched at 4 corners with swaging tool.



**4**  
Nut cannot work loose and variation in thickness of metal is taken care of automatically.

### MILLIONS A DAY!

Automobiles  
Refrigerators  
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Metal Furniture  
Military Tanks  
Ordnance Equipment

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METAL CLEANING JOB?

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FOR IT?

During the past year, the Oakite Chemical Laboratory has produced 16 new materials for performing the following metal cleaning and processing operations:

- 1 Heavy-duty cleaning in tanks
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- 3 Washing in pressure-spray machines
- 4 Electrocleaning zinc-base die castings
- 5 Putting heavy zinc phosphate coatings on steel in preparation for painting
- 6 One-operation cleaning, pickling and conditioning for painting
- 7 Stripping paint
- 8 "Killing" paint in spray booth wash water
- 9 Drawing and forming

One of these new materials may be the right answer for some problem that's been giving you a lot of trouble.

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Metal Cleaning." It has been revised to discuss application of the 16 new materials. Tell us which jobs interest you and we'll be glad to give more information. Write to Oakite Products, Inc., 30H Rector St., New York 6, N. Y.



SPECIALIZED INDUSTRIAL CLEANING  
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MATERIALS • METHODS • SERVICE

Technical Service Representatives in  
Principal Cities of U. S. and Canada

## Ferroalloy Prices

(Effective July 7, 1953)

### Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	\$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	36.95
Ton lots	38.45

### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00
Premium for hydrogen-removed metal	1.50

### Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

### Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn

	21.35¢
--	--------

### Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

### Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00. Add \$1.05 per ton for each additional 0.50% Si up to and including 17%. Add \$1.00 for each 0.50% Mn over 1%.

### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

36% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

### Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

### Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.00

### Calcium Metal

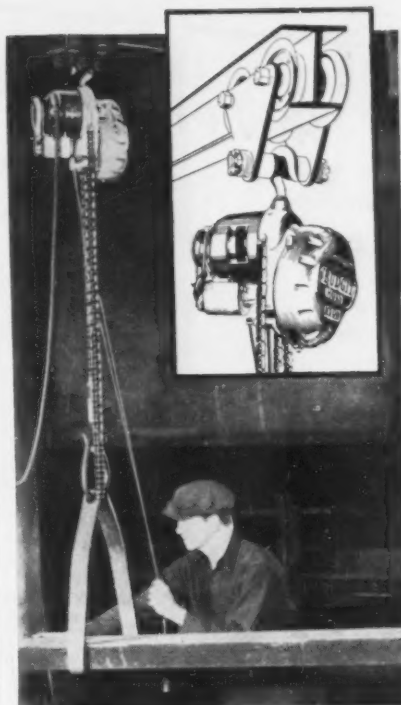
Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55

### Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	\$3.00-\$3.10
Crucible	3.10-3.20
High speed steel (Primus)	3.20-3.25



## PAYS FOR ITSELF IN SAVINGS

A few cents' worth of current a day is all the 'Budgit' Electric Hoist uses to step up production speed and efficiency. In less than two seconds, the 1/4-ton 'Budgit' lifts the full load one foot. A slight pull on the control cord starts this fast lifting action. One hand is always free to guide the load. No muscle strain. No more injuries or time out due to the hazards of heavy manual lifting.

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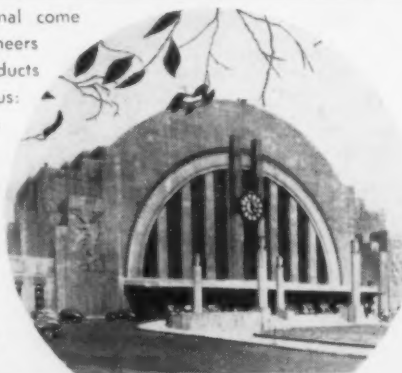
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## Ferroalloy Prices

(Effective July 7, 1953)

<b>Alstifer</b> , 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carloads .....	9.90
Ton lots .....	11.30
<b>Calcium molybdate</b> , 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo .....	\$1.16
<b>Ferrocolumbium</b> , 50-60% 2 in. x D contract basis, delivered per pound contained Cb.	
Ton lots .....	\$4.90
Less ton lots .....	4.90
<b>Ferro-Tantalum-Columbium</b> , 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta .....	\$2.75
<b>Ferromolybdenum</b> , 55-75%, f.o.b. Langeloth, Pa., per pound con- tained Mo .....	\$1.32
<b>Ferrophosphorus</b> , electrolytic, 23- 26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton .....	\$65.00
10 tons to less carload .....	\$75.00
<b>Ferrotitanium</b> , 40% regular grade, 0.10% C max., f.o.b. Ni- agara Falls, N. Y., and Bridge- ville, Pa., freight allowed, ton lots, per lb contained Ti .....	\$1.30
<b>Ferrotitanium</b> , 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti .....	\$1.50
Less ton lots .....	1.50
<b>Ferrotitanium</b> , 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, car- load, per net ton .....	\$177.00
<b>Ferrotungsten</b> , ¼ x down, packed, per pound contained W, ton lots, f.o.b. ....	\$4.45
<b>Molybde oxide</b> , briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. ....	\$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. ....	\$1.13
<b>Stannal</b> , 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump .....	14.50¢
Ton lots, bulk lump .....	15.75¢
Less ton lots, lump .....	14.50¢
<b>Vanadium Pentoxide</b> , 86-89% V <sub>2</sub> O <sub>5</sub> contract basis, per pound contained V <sub>2</sub> O <sub>5</sub> .....	\$1.31
<b>Zirconium</b> , 35-40%, contract ba- sis, f.o.b. plant, freight al- lowed, per pound of alloy.	
Ton lots .....	\$1.00¢
<b>Zirconium</b> , 12-15%, contract ba- sis, lump, delivered, per lb of alloy.	
Carload, bulk .....	7.00¢
<b>Boron Agents</b>	
<b>Borostil</b> , contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B ..	\$5.35
<b>Bortam</b> , f.o.b. Niagara Falls	
Ton lots, per pound .....	48¢
Less ton lots, per pound .....	50¢
<b>Corbortam</b> , Ti 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound .....	10.00¢
<b>Ferroboration</b> , 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots. ...	\$1.30
F.o.b. Wash., Pa.; 100 lb up	
10 to 14% B .....	.85
14 to 10% B .....	1.30
19% min. B .....	1.50
<b>Grinnal</b> , f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1 .....	\$1.00
No. 6 .....	68¢
No. 79 .....	50¢
<b>Manganese - Boron</b> , 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 3 in. x D, del'd	
Ton lots .....	\$1.45
Less ton lots .....	1.57
<b>Nickel - Boron</b> , 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered	
Less ton lots .....	\$1.30
<b>Silenz</b> , contract basis, delivered.	
Ton lots .....	48.00¢

# CUT COSTS WITH MULTIPLE BENDING

Whether you're bending pipes, tubes, reinforcing bars or structural shapes, you can greatly increase your bending production by multiple die bending.

Shown here is our Model A-5 BENDING MACHINE, tooled for bending 3 different radii without changing the set-up. In order to make multiple bending cost no more per die than single bending, individual dies are merely stacked on the die spindle and a shoe of the proper width permits the same degree to be bent without changing the automatic re-set switch. The MODEL A-5 will bend pipe up to and including 2" standard weight pipe.

Redesigned and greatly improved, the Model A-5 still sells for only \$1975, F.O.B. factory, U. S. Funds.

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No. 30-A  
Bottom Dump Bucket

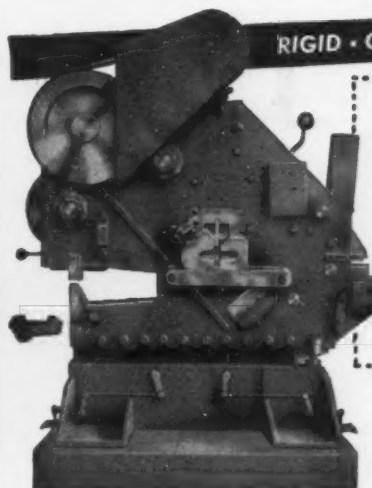
Exclusive design makes this bottom dump bucket easy to operate . . . easy to open. Efficient for foundry use in handling all types of sand, molded or core, dry or prepared. Can be used with coke, scrap iron and castings also. Sizes 7 to 200 cu. ft.



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Shears Plates	7/16"	1/2"	5/8"
Shears Flats	3-3/16" x 9/16"	3-3/16" x 5/8"	4" x 3/4"
Shears Angles (Square Cut)	3 1/4" x 5/16"	4" x 3/8"	5" x 1/2"
Shears Tees	3 1/4" x 5/16"	4" x 3/8"	4 3/4"
Shears Round	1-13/16"	1 3/8"	1 3/4"
Shears Square	1"	1 1/4"	1 1/2"

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## The Clearing House

NEWS OF USED AND REBUILT MACHINERY

**Buyers Are Cautious . . .** Used machinery buyers are playing it close to the vest in the Pittsburgh district and this attitude has tended to level off prices and decrease business volume. The dealer who bought equipment at inflated prices with the hope of making a profit is beginning to worry.

An example of this situation is the case of a dealer in another district who has been forced to drop his price on a piece of equipment by several thousand dollars. He now can make a profit of only several hundred dollars and, since he still has no takers, may be forced to sell at a loss.

**Stress Economy . . .** The cautious attitude of buyers is also reflected in the experience of a dealer in electrical equipment. In the plush days, he says, steel PA's invariably ordered a spare for each motor purchased. Not so today. The new policy is to buy just what is needed and to make repairs in case of a breakdown rather than shove in another new or rebuilt motor. Emphasis is on economy in all operations.

Generally, Pittsburgh dealers are moaning the blues, but there

are some exceptions. One dealer reports that business in the last 30-40 days was a howling success, quite in contrast to his experience in previous months when volume was down.

He can't account for the change except to point out that sometimes deals that have been on the fire for months suddenly click all at once. But even this dealer, enjoying better than average business, reports buyers are fighting prices. The old urgency to buy just isn't there any more.

**Coal Slump Hurts . . .** Due largely to the big drop in coal mining and reduced steel mill demands, volume of the leading electrical equipment dealer in the Pittsburgh area is off 40 pct from last year. Slack days in the coal mines have been the most severe blow. Four to 5 years ago this dealer conducted 45 pct of his business with the mining industry. Last year this ratio dropped to 13 pct and so far this year is running around 3 pct.

Steel mill equipment business is not strong. Inquiries are fairly good, but it's still extremely hard to close deals.



TWO THAILAND BOYS receive instruction in the use of an American-made milling machine as part of their regular academic training. The machine was shipped to a school in Thailand by Ganey Machinery Co., Buffalo used machinery firm, which occasionally conducts its own Point Four Program.